

owers pro-
n orchard
reater ha-
erence is
that the
northern
lossoming
ing frosts

covering—
because
least li-
e practice
erries to
ogs with
a means
The sand
which to
l drained
n poorly
the soil is
expended
nd not in
illage re-
e a loose,
at than a

neyard

7)
tions, the
thorough
and leaf-
mildews
On the
ly better
e definite
with the

thorough
is, stimu-
the pests
While ex-
voided, a
sential to
A cover
oats or
e soil in
trogenous
omit a
ar exces-
ful if a
the cover
sown at
ly in the
practice to
the clear
houses
isles dur-
00 lbs. of
ag. This
e of 4 1/2
and a little
son. Su-
pruning,
thorough
e culture
a rather

t Trees

10).
s to cau-
plates in-
get the
w on the
bove the
o occur if
Also good
s to the
ples used
old split-

e of agri-
al. Wire
nd can be
Davis or

edal

gical So-
g in New
edal for
the Lobo
McIntosh
al Experi-
ada.
the Cort-
sing a
New York
at Station
a McIn-
the trees
o mature
he McIn-
ork some
which will
n.

Subscription Rates
UNITED STATES AND POSSESSIONS
One Year, 50 cents. Three Years, \$1.00
Foreign, \$1.00 per Year

Manager of Circulation
WILLIAM D. COLLINS

Advertising Rates
\$1.75 an Agate Line Flat, or \$24.50 per Inch
Classified, 15c a Word

Entered as second-class matter Oct. 17, 1917, at Post
Office at Chicago, Ill., under the Act of March 3, 1879

The National Fruit Magazine of America

AMERICAN FRUIT GROWER MAGAZINE

(Title Registered in United States Patent Office.)

Member of the Audit Bureau of Circulations

PUBLISHED MONTHLY BY
MAGAZINES, Inc., 53 West Jackson Blvd., Chicago, Ill.

HARRY W. WALKER, General Manager
C. I. LEWIS, Managing Editor

Associate Editors
SAMUEL ADAMS PAUL C. STARK
CHARLES A. GREEN
HAZEL BURSELL MARY LEE ADAMS

ADVERTISING REPRESENTATIVES
Western Manager J. C. BILLINGSLEA,
J. F. JENKINS, 1119 Advertising Bldg.,
53 West Jackson Blvd., Chicago, Ill.
Eastern Manager A. H. BILLINGSLEA,
ROGER FISON, 342 Madison Ave.,
15 Park Row New York City.
A. D. McKINNEY, Pacific Coast Manager,
Post-Dispatch Building, W. A. SCOTT,
St. Louis, Mo. 606 Couch Building,
Portland, Ore.

Vol. XLIV.

FEBRUARY, 1924

No. 2

Some Notes on Spray Machinery

by O. G. Anderson
Purdue University

CHANGES and improvements in spray machinery since 1910 have been as marked and nearly as numerous as in the automobile. We have sometimes taken them for granted, but when our fruit had too many seconds or the spray machine broke down, we have felt like telling the manufacturer to get busy.

Under war conditions he got busy and furnished equipment which greatly increased the efficiency of men and teams in the orchard. Because a spray machine is so vital to the production of good fruit, it may be well to review some of the problems relating to its selection and operation.

Spray Machinery Specifications.

Pumps made entirely of cast iron are satisfactory for pumping water; but the water passing through a spray machine is merely a carrier for spray chemicals which corrode or eat out cast iron. For this reason the manufacture of spray machinery is a specialized industry requiring constant attention from keen, observing builders. Such men have found for example, that brass, bronze or porcelain working parts are absolutely essential in a spray pump, and packing must meet unusual tests, while engines must develop more horsepower in proportion to weight than is demanded of stationary types. We mention these requirements because machines may still be found on the market which do not comply with these specifications. Unfortunately some growers buy them, too, just because they are cheaper.

Just when manufacturers thought they were building pretty good machines, the spray gun was introduced, pressures were increased 50 to 125 pounds, and the daily output of a sprayer was also largely increased. Before long, growers were complaining of larger repair bills and earlier junking of sprayers. This was bound to happen because the outfits had not been built to withstand this heavier load. So the builders set to work once more to design sprayers made of stronger materials and rated for much greater output.

Types of Spray Machinery.

This evolution has increased the possible combinations in power sprayer design from four or five styles until one factory now offers 22. These machines may be readily grouped into three classes, according to capacity. First there are the 1 1/2 and 2 horsepower outfits for small acreages, delivering 3 1/2 to 5 1/2 gallons of spray mixture per minute. Then there are machines of 3 to 6 horsepower delivering from 8 to 15 gallons per minute, and the great majority of the outfits sold come within this group. Finally we have the super-outfits for the large orchards, developing from 8 to 15 horsepower and delivering 15 to 25 gallons per minute. Ten years ago an outfit machine discharging 13 gallons of liquid per minute was a mammoth outfit and 250 pounds was the last word in pressure. Today this pressure is the minimum requirement where the spray gun is the nozzle used, and outfits delivering 10 to 12 gallons per minute are the ones most



A 400-gallon water conveyor which fills a 300-gallon spray outfit in three minutes. Both machines are equipped with extra wide sectional rims for soft ground. Some sort of tower is indispensable for trees more than 22 feet tall. The sprayer is a 15 horsepower, 20-gallon-a-minute machine, which supplies three guns handily.

commonly sold. In 1914 the largest outfit cost about \$350; today a 20-gallon machine averages about \$1000. The difference in price is due not only to higher wages and general overhead, but to larger engines and pumps built of materials greatly su-

The Outfit to Buy.

"Which one of these outfits shall I buy?" is a question often raised by the grower. The answer depends on the size of the orchard and the kind of nozzle used. Most commercial growers are able to maintain a daily



There is fog and life in the spray coming from this gun. This 3 1/2 horsepower machine carries one gun nicely, but with two guns the spray is coarse and spattering, the outfit is overloaded and its period of usefulness shortened.

perior in strength and yet much lighter in proportion to the power developed. And a considerable part of the manufacturing expense comes from the factory equipment necessary to produce the numerous models now on the market.

output of six to eight tanks of spray mixture. The limit of satisfactory performance for an outfit will then be measured by the critical spray of the season. For instance, the apple grower in a humid region may find that to control scab effectively, he

must have an outfit large enough to cover his orchard in five or six working days. In another region the apple grower finds the blossom spray is the critical time. His varieties may allow him two weeks to spray, but in that time there are two Sundays, and he must allow for rainy weather and breakdown.

How the Spray Gun Affects the Size of Outfit Purchased.

After the necessary capacity of the outfit has been figured, the nozzle may still have to be considered. Any nozzle of small capacity like the standard disk type can be used on any power outfit, and even on the barrel pump. But a grower who attempts to use a gun should have at least six gallons of spray mixture per minute to operate it properly. In daily performance, therefore, a gun should be used only on outfits of three horsepower or above in capacity. Many growers may not at first agree with this statement, and may refer to the many smaller outfits on which guns are now used. But there seems to be plenty of evidence to prove the point. We cannot quote at length, but LeRoy Childs, Superintendent of Hood River Experiment Station, Oregon, writing for the February, 1923, issue of this magazine states, "With the appearance of the spray gun has come much ineffective spraying. Not because the spray gun is a failure, but because growers have tried to use it on all types of sprayers. . . . At Hood River we find that the gun operated on a 1 1/2 horsepower outfit has given poor results." He also found that operating two guns on a 3 1/2 horsepower outfit was unsatisfactory, and similar conclusions have been reached from tests made at Purdue University. The guns thus operated deliver a coarse, spattering spray, the tops of large trees are not properly covered, and the overload on the outfit shortens its period of usefulness.

To sum up the requirements for proper operation of a gun, we should have:

First—An outfit delivering at least six gallons per minute for each gun used.

Second—Three hundred pounds pressure on most outfits, with 250 pounds a safer pressure on the smaller as well as older outfits.

Third—Disk openings in the guns should be one-eighth inch to nine sixty-fourths inch in size, delivering from five and three-fourths to six and one-half gallons per minute when fully open.

Only when these requirements are met can we expect a finely divided spray and thorough covering of all portions of the tree.

Does Your Machine Operate Efficiently?

Bearing in mind that each gun used should have a pump capacity of six gallons behind it, Fruit Grower Brown figures that his four horse-power twelve-gallon machine will carry two guns. The salesman told him it would, and it may, until pump packings and gun disks get worn a hundredth part of an inch, or the engine idles down. It is not generally known

(Continued on page 12.)

Spraying the Georgia Peach Crop

by **Oliver I. Snapp** and **John C. Dunegan**

U. S. Bureau of Entomology

U. S. Bureau of Plant Industry

FIGHTING the insects and diseases that attack the peach fruit has been the most important problem confronting the Georgia peach grower since 1920, when the crop was damaged to the extent of several million dollars by the peach curculio. Recent life history studies of the curculio have revealed the fact that frequently two generations of the insect occur annually in Georgia, as was perhaps the case during the disastrous 1920 season, and that usually a large percentage of the "worms" in the peaches at harvest time in Georgia are "worms" or larvae of the second brood. These new scientific truths called for a revision of the spray schedule which had been used in Georgia for a number of years prior to 1921. When the new spray schedule was formulated in 1921, control measures were directed against two broods of the curculio. This new schedule has given excellent results during the last three years, and with supplementary control measures has reduced Georgia's curculio infestation to normalcy again.

First Spray Is Applied When Petals Fall.

A very important discovery in the feeding habits of the curculio was made several years ago in the south when it was found that the beetles

ment materially reduces the curculio infestation in the peach "drops." The second spray is applied to

peaches in Georgia when the calyces are shedding, or when the small peaches are exposed, which is usually

about 10 days after the petals fall. The old schedules called for the first spray to be applied at this time. The same materials are used for this second spray as for the first, as mentioned above.

Spraying for Brown Rot.

Two weeks after the second application or between three and four weeks after the petals have been shed, the third spray is applied to Georgia peaches. This is primarily for the control of scab, but is also the first brown rot spray, and self-boiled lime-sulphur (8-8-50) is used alone. The sulphur-lime-calcium caseinate or dry mix substitute for self-boiled lime-sulphur has been used to some extent for brown rot control, but more or less burning of the foliage has resulted under Georgia weather conditions from the use of dry mix formulae which have worked satisfactorily in other states. Experimental tests with different dry mix formulae are being continued in Georgia with the hope of eventually finding one which can be used with safety under weather conditions there, as the advantages of the new spray are realized if it is as effective as the self-boiled material and if it can be used without injury to the foliage or fruit.

No lead arsenate is used in the third spray unless the curculio infesta-

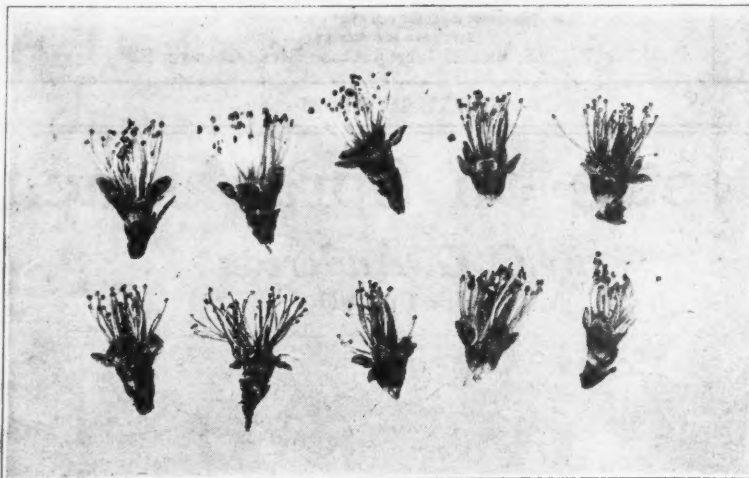


Fig. 1—Peach flowers showing curculio feeding marks in calyces.

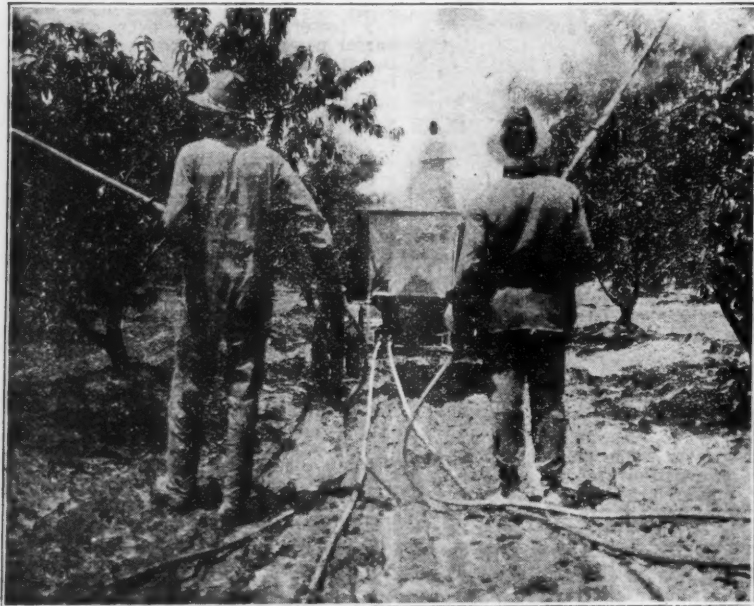


Fig. 2—Spraying with arsenate of lead when 75 per cent of the petals are down for the control of the curculio as they appear from hibernation.



Fig. 3—Some growers prefer the dust spray to the liquid spray for the control of peach pests.

fed to a considerable extent on the calyces of the peach flower while they are green and succulent (Fig. 1). The curculio starts to appear from hibernation in numbers by the time the peach trees are in full bloom. Before the curculio can get to the small peach fruit, which at that time is enveloped in the flower, they take a good meal or two from the calyces, which are then green and apparently palatable to the insects. It was found that by poisoning the calyces with an application of arsenate of lead when about 75 per cent of the petals had dropped, a number of the adult curculios were killed off while the little peach was still enveloped in the calyx and before the insects could get to it to deposit eggs (Fig. 2). It was also found that the curculio always feeds considerably before depositing any eggs, and this early feeding in the spring takes place to a large extent on the calyces of the peach flower. Georgia peach growers now apply the first curculio spray when 75 per cent of the petals (pink) are down and use the powdered arsenate of lead in the proportion of four pounds to the 200 gallons of water with milk of lime from 12 pounds of unslaked lump lime. This early lead arsenate treat-

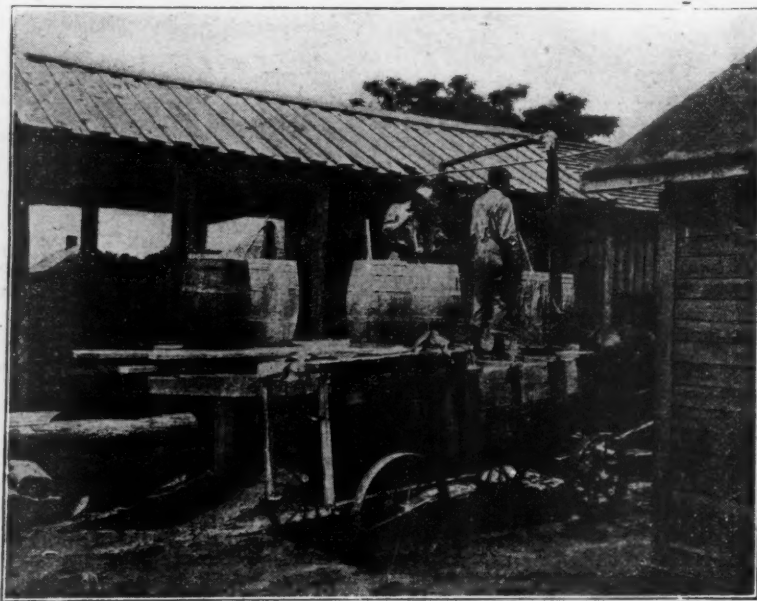


Fig. 4—A convenient arrangement for making the self-boiled lime-sulphur.

tion was particularly heavy the year before, or unless there is reason to suspect that it will be heavy during the current season. Peach trees in Georgia will not stand more than three lead arsenate applications as an annual treatment. These are applied in the first, second and fourth sprays. Under abnormal curculio conditions, lead arsenate is also used in the third application; however, this is done only in case of an emergency, as four applications of arsenate of lead per season result in rather severe burning of the foliage.

Spraying for the Second Brood of "Worms."

The Georgia peach grower believes the fourth and last spray is the most important of all, and he is right because it is for the second brood of "worms," which is usually responsible for most of the wormy peaches at harvest time. The second brood makes its appearance in Georgia with the ripening of the Hiley and continues to appear throughout the Georgia Belle and Elberta ripening season. Varieties ripening before the Hiley escape damage from the second brood, and consequently the fourth spray is often

(Continued on page 18.)

Orchard Spray Program for the Pacific Northwest

By A. L. Lovett, Entomologist and H. P. Barss, Plant Pathologist
Oregon Agricultural Experiment Station

On account of the climatic differences existing between the more humid orchard sections west of the Cascade Mountains and the semi-arid or arid and irrigated regions east of this range, the conditions as to pests and diseases are different and require a somewhat different spray program. In general there are a greater number of diseases and pests to be sprayed for in western Oregon, Washington and British Columbia than in the drier orchard sections of the interior. Hence the full spray program for the section west of Cascades will be presented and then followed by paragraphs outlining the program for other sections.

SPRAY PROGRAM I

For humid sections of Washington, Oregon and British Columbia west of Cascades

APPLES AND PEARS.

Time of Application.	Pest or Disease.	Spray Material and Strength.
(1) Dormant spray. As winter buds swell just before opening.	San Jose Scale, blister mite and Spider mites. (Footnote 6.)	Lime-sulphur 12 to 100 or miscible oil 8 to 100.
	Apple leaf roller. (Footnote 5.)	Dormoil 8 or 10 to 100.
(2) Pre-pink (delayed dormant) spray. Cluster buds separating just enough to expose blossom buds.	Scab and powdery mildew.	Lime-sulphur 3½ to 100.
	Aphids on apple. (See Footnote 1.)	Add nicotine sulphate ½ lb. to 100 gal. of spray.
(3) Pink or pre-blossom spray. Just before blossoms open.	Scab and Mildew.	Lime-sulphur 2½ to 100.
	Fruit worms on pear and bud moth.	Add lead arsenate 3 lbs. to 100 gal. of spray.
(4) Calyx spray. As last petals fall. Before apple calyx closes on central fruit in cluster.	Scab and Mildew.	Lime-sulphur 2½ to 100. (Footnote 2.)
	Codling moth on apple.	Lead arsenate 2 lbs. to 100 gal.
	Fruit worms on pear (if pink spray was not applied).	Lead arsenate 2 lbs. to 100 gal.
(5) Fifteen-day spray. About 15 days after petals fall.	Scab and Mildew.	Lime-sulphur 2 to 100.
	Pear slug.	Lead arsenate 2 lbs. to 100 gal.
(6) Thirty-day or first cover spray for worms. Three to five weeks after petals fall.	Codling moth. (Footnote 3.)	Lead arsenate 2 lbs. to 100 gal.
	Scab and Mildew.	Lime-sulphur 2 to 100.
(7) July spray. July 10 to 25 depending on locality and season.	Codling moth, second generation.	Lead arsenate 2 lbs. to 100 gal. (See Footnote 4.)
	Anthraxnose canker.	
(8) August spray. August 10 to Sept. 5 depending on season and locality.	Codling moth. (May usually be omitted on pear.)	Same as for No. 7.

Footnote 1. Where aphids are very bad, especially with varieties somewhat resistant to scab, omit nicotine from Spray No. 2, adding it to Spray No. 3, which should then be applied just as soon as the blossom buds separate from each other.

Footnote 2. Ordinary lime-sulphur is liable to russet the skin of some varieties of pears like d'Anjou, Comice and Howell, and may cause burning of apples when hot weather comes on. Under such circumstances substitute self-boiled lime-sulphur 8-8-50 or a reliable wettable sulphur or Atomic Sulphur 12 lbs. to 100 gal.

Footnote 3. Codling Moth control is such a complex problem and of such outstanding importance, that too much dependence should not be placed upon a general spray program of this nature. Supplement the suggested program with all the trained assistance and advice obtainable. An additional cover spray two weeks after the 30-day spray is advisable where worm control has been poor. This extra spray seems especially advisable on varieties which grow rapidly, as the King, to afford protection for the rapidly expanding surface. The late cover spray may usually be omitted on pear. Supplement the spraying by the careful collection of wormy fruit at thinning time, it pays. Scrape the scaly bark from the trees during February and March, band the trees in June and destroy the accumulated worms every two weeks. Increasing the dosage of lead in the late cover spray to 3 or 4 lbs. to 100 gal. is a fairly common practice and, for bad worm infestations, is advisable. Codling moth is not a commercial orchard pest of British Columbia and no program of control is required.

Footnote 4. Anthracnose or black spot canker and fruit rot may be successfully prevented by a single thorough summer application of Bordeaux mixture 4-4-50. For the sake of economy this may be put in with the July or August worm spray. A fine misty spray should be used and if casein spreader is added it should be dissolved first in water before going into the tank. Commercial ready-mixed Bordeaux materials are inferior to the properly home-made spray.

Footnote 5. Leaf Rollers occur as a major pest only in certain of our fruit sections. Oil emulsion in the early pre-pink (delayed dormant) is the standard spray. Dormoil has given uniformly better results in leaf roller control than other western oils. Some miscible oils are apparently of little value in control. Where conditions develop that prevent maximum effectiveness from the oil spray and for very light infestations of leaf-roller, use double strength lead arsenate (4-100) in the pink spray.

Footnote 6. Blister Mite on pear is controlled with a fair degree of certainty by the dormant lime-sulphur in the spring; in fact, if especial attention is given to thoroughness, an application of dormant lime-sulphur one year in three will control blister mite on pear. Equally favorable results on apple are by no means the rule. Failures, where thoroughness has been observed, are usually due to delaying the application too late. So frequently are poor results secured by spring applications on apple that where blister mite is serious, fall sprays are advised. Use 8 to 12 gal. lime-sulphur for every 100 gal. of water, any time in the fall after the majority of the leaves fall, up until early December.

PRUNES AND PLUMS

(1) Dormant spray. As winter buds are ready to open.	San Jose Scale, spider mite, twig miner.	Lime-sulphur 12 to 100. If scale is absent dilute 8 to 100.
(2) Pre-blossom spray. Buds white just before opening.	Brown rot (Monilia) Blossom blight.	Bordeaux 4-4-50 with spreader or lime-sulphur 3 to 100.
	Bud moth.	Lead arsenate 2 lbs., lime 2 lbs. to 100 gal.
	Aphids.	Nicotine sulphate ½ lb. to 100 gal.
(3) First fruit spray. As soon as shucks fall.	Cylindrosporium leaf spot and brown rot.	Self-boiled lime-sulphur 8-8-50 with spreader or Atomic sulphur 12 lbs. to 100 gal.
	Syneta beetle.	Lead arsenate 2 lbs., lime 2 lbs. to 100 gal.
(4) and (5) About June 1 and July 1.	Cylindrosporium or brown rot if troublesome.	As under (3).
(6) August spray. About a month before harvest.	Brown rot.	As under (3).

PEACHES

Time of Application.	Pest or Disease.	Spray Material and Strength.
(1) Leaf Curl spray. From December to mid-February.	Peach Leaf Curl.	Bordeaux mixture 6-6-50.
(2) Late dormant spray. Just as first buds are ready to open.	Peach twig miner, San Jose scale, spider mite.	Lime-sulphur 12 to 100. If scale is absent, dilute 8 to 100.
	Bud moth.	Lead arsenate 2 lbs., lime 2 lbs. to 100 gal.
(3) First fruit spray. As soon as shucks fall.	Peach blight (fruit spot), mildew or brown rot.	Self-boiled lime-sulphur 8-8-50 with spreader or Atomic Sulphur 12 lbs. to 100 gal. If had repeat once or twice at 2 or 3 week intervals.
(4) Late summer spray. About 6 weeks before harvest.	Brown rot.	Same as No. 3 or use dusting sulphur when air is still.
(5) Early fall spray. As soon as each variety is picked.	Peach blight and die back.	Bordeaux 4-4-50.

CHERRIES

For San Jose Scale—Same as No. 1 on prune program.
For Aphids—Use nicotine sulphate, 1 lb. to 100 gal. with pre-blossom spray (same as No. 2 for prunes). Use tanglefoot bands on trees to prevent reinfestation of aphids by ants.
For Cherry Fruit Maggot—Use sweetened poison spray for adult flies. Use: Lead arsenate, ½ lb.; syrup, 2 qt.; water, 8 gal. Apply about 1 qt. to the tree, spraying the upper surface of the outer leaves only; when adult flies appear. This will be from June 8 to 20. Repeat application 10 days later and give a third spray one week after second.
For Brown Rot (Monilia) Blossom Blight—Same as No. 2 on prune program.
For Cylindrosporium Leaf Spot—(Yellow Leaf). Same as Nos. 3, 4, 5, on prune program.
For Brown Rot on Fruit—Use self-boiled lime-sulphur 8-8-50 with spreader, or Atomic Sulphur 12 lbs. to 100 gal. or a reliable wettable sulphur, one month before picking. Begin earlier if disease shows up sooner and repeat every 3 weeks till a month before picking.

APRICOTS

For Brown Rot (Monilia) Blossom Blight—Same as No. 2 on prune program. Prune out and destroy all dead twigs and spurs in winter.
For Fruit Spot—(Peach Blight fungus.) Same as Nos. 3 and 5 on peach program.
San Jose Scale and other insects same control as for similar insects on peach.

SPRAY PROGRAM II

For semi-arid sections of the Northwest east of Cascade Range and for Rogue River Valley in Oregon.

APPLES AND PEARS

Scab—Present and troublesome only in a few localities. Where sufficiently abundant to justify spraying, apply Nos. 3 and 4 in Program 1 for apples and pears.
Powdery Mildew—Use applications Nos. 2, 3, 4 and 5 in Program 1 for apples. Continue if necessary. Observe Footnote 2. Use casein spreader first dissolved in water. Supplement by winter and summer pruning out. Pink spray most important to avoid sulphur shock.

Codling Moth—(Except for British Columbia.) Following the calyx application the first cover spray (30 day) is applied just before first worms hatch. In general this will be earlier for interior (15 days) than for coast area. Follow with; second cover spray 2 weeks after first cover spray; third cover spray 4 weeks later, and fourth cover spray 4 weeks after third.
For southern Oregon an additional late cover spray may be necessary. Double strength lead in late sprays advisable. Calyx spray on pears likewise advisable in southern Oregon.

For eastern Washington, northern Idaho, the Grande Ronde Valley of Oregon, follow Program 1. Although in higher altitudes probably two cover sprays will generally suffice.
Citrus Red Spider—Use spray No. 1 in program 1, and see Footnote 6.
Blister Mite—Use spray No. 1 in Program 1. For apple see Footnote 6.
Leaf Rollers, Fruit Worms, San Jose Scale, Aphids—Follow Program 1 for these insects.

PEACHES

Leaf Curl, Mildew and California Blight, Twig Miner, San Jose Scale, Spider Mite—Follow Program 1 for these diseases and insects.

CHERRIES

Practically no fungous diseases requiring spray. Insects in general would require no regular program of sprays. For specific pests follow Program 1 for cherry.

APRICOTS

California Blight—Follow Program 1 for peach blight. Insect pests and treatment same as for peach in Program 1.

PRUNES AND PLUMS

No fungous diseases requiring spray as a rule.
San Jose Scale, Twig Miner and Spider Mite are principal insect pests. Where present control with spray No. 1 in Program 1 for prunes and plums.

SPRAY POINTERS

The proportions of lime-sulphur recommended for sprays in this bulletin are based on the use of the standard concentrated liquid lime-sulphur testing about 32 degrees by Baume hydrometer test. Thus where the recommendation "lime-sulphur 12 to 100" appears in the calendar, it means that 12 gal. of the concentrated liquid lime-sulphur should be used in every 100 gal. of spray to make the proper dilution.

Where the powdered or "dry lime-sulphur" is used, it will take about 4 lbs. of the dry powder to equal 1 gal. of the standard concentrated liquid lime-sulphur in active ingredients. For example, where this bulletin recommends "lime-sulphur 12 to 100," the grower employing the dry form should use 48 lbs. of the dry lime-sulphur with every 100 gal. of water to get the same strength of spray.

The powdered form of lead arsenate is the basis of the formulas for this poison recommended in this bulletin. Where arsenate in paste form is used the grower should employ double the number of pounds indicated in the bulletin.

Bordeaux Mixture is most satisfactory when freshly made according to standard methods. The "ready-mixed" type of commercial Bordeaux is in general decidedly inferior to good home-made spray. The type of commercial Bordeaux powders, in which the powdered bluestone and hydrated lime are sold in separate packages and added separately to the spray tank, appear to be better than the materials combined by the manufacturer. The hydrated lime must not have become air-slaked (carbonated) when used and directions must be followed carefully or poor results will be obtained.

Home-made Bordeaux must be used the same day it is made or else ordinary cane sugar must be added at the rate of 1 oz. (1 heaped tablespoon) for every 8 lbs. of stone lime or 10 lbs. of hydrated lime employed. The sugar should be dissolved before adding to the tank of Bordeaux. It prevents the spray from crystallizing and deteriorating.

Spreader—Materials used with a fungicide or insecticide spray to increase the spreading and adhesive powers are rapidly coming to the front. Calcium caseinate is excellent for use with lead arsenate alone. Where added in powder form to sprays containing Bordeaux, lime-sulphur or other fungicide it sometimes gums things up badly. In such cases it is suggested that the spreader be completely dissolved in water before adding to the spray tank.

Dusting—Experimental work in the Northwest in general has not been very encouraging to the substitution of dusting for spraying especially in those sections subject to severe attacks of fungous diseases under relatively cool climatic conditions, but improved materials, machinery and application methods now under test may show dusting to be worth while in controlling certain special pests.

Spray Combinations—Any of the materials mentioned in this spray program in connection with any particular application may be successfully combined, but it is best not to add lead arsenate to a tank of diluted lime-sulphur until the last thing before starting to spray.

Sulphur Shock—Under certain climatic conditions if lime-sulphur has not been used on apple trees in the earlier pre-pink or pink applications, a very severe injury with foliage and fruit drop may result when lime-sulphur is applied later after blooming. This is known as sulphur shock and occurs without regard to strength of spray. Immunity against this danger can be secured only by application of the pre-blossom sprays as scheduled.

Cherry Diseases and Their Control

by W. C. Dutton

Michigan Agricultural College

THE PRODUCTION of sour cherries has become one of the most important branches of the fruit-growing business in several states in the region of the Great Lakes. The heaviest production is in Michigan, Wisconsin, New York and Northern Ohio, and all these districts have climatic conditions which are frequently favorable to the development of many fungous diseases, and it is fortunate, perhaps, that this is true, as many slipshod and careless growers are automatically eliminated sooner or later because of their failure to control certain enemies of the cherry tree. Most of the diseases of the cherry can be controlled if proper methods are employed, and it may be said then that they are really "blessings in disguise" for the grower who cares for his orchard in the proper way.

There are several diseases affecting the cherry which are neither common nor serious and they will not be discussed here. There are, however, several diseases which are frequently serious and deserve attention. The most important are leaf-spot, brown-rot, root-rot and gummosis, but this discussion will be limited to leaf-spot and brown-rot.

Brown-rot.

Brown-rot is usually not serious with sour cherries, but in some seasons may cause rather heavy losses. In Michigan, in 1922, weather conditions were favorable for its development, and the disease developed in some districts to an alarming extent, so that carlot shipments decayed badly in transit and many lots were rejected at the canning factories. Sweet cherries are generally more susceptible than the sour varieties and heavy losses with them frequently occur just as the fruit is ripening. The susceptibility of the fruit to brown-rot increases as the fruit matures so that the resistance is least just at the most critical time. The brown-rot fungus is carried over the winter in the "mummies," which either hang on the tree or drop to the ground. "Mummies" are the dried and shriveled cherries that were affected by brown-rot the previous year, or earlier. The spores which spread the disease are first discharged about the time the blossoms open and injury to the blossoms is frequently serious, although the greatest injury is to the fruit. It is fortunate for the grower that thorough treatment with the proper materials will usually control brown-rot. Definite recommendations for control measures will be given later.

Cherry Leaf-Spot.

Leaf-spot is one of the most serious of the diseases attacking the sour cherry; the sweet cherries are usual-

ly not quite so susceptible. There is much difference in susceptibility of different varieties. English Morello is extremely susceptible and this is one of the reasons why this variety

leaf or shot-hole fungus. The name used frequently varies with the way in which the fungus develops on the leaves. The fruit and fruit stems may be affected but the trouble is

the blossoms have dropped, and the first evidence of leaf-spot usually is apparent not earlier than the last of May or early in June. This statement applies to the northern states. Its appearance farther south would occur somewhat earlier. Spores of another type are then produced on these new leaves, which carry the disease to the leaves that develop later. Diseased leaves usually fall to the ground. This process may be repeated several times during the summer if weather conditions are favorable, or it may go on almost continuously if rains are frequent.

Weather Conditions and Leaf-Spot.

Leaf-spot does not, in most districts, develop in really epidemic form every year. It will usually be found every year to a certain extent, but may not cause any injury to the trees in many seasons. The seriousness of this disease depends almost entirely on the amount and distribution of rainfall, particularly during the early part of the growing season. The fungus simply cannot develop and spread without a liberal supply of moisture. In the first place the old leaves must be thoroughly wet for some time before the spores can be discharged and the leaves upon which they fall must remain moist for several hours if they are to germinate and grow into the new leaves. Similar conditions must prevail, in a general way, during the summer if secondary infections are to occur. These statements show, then, that leaf-spot epidemics are dependent upon rainfall, and as every season is not "wet," we do not have a leaf-spot epidemic every year.

The fact that leaf-spot does not develop to a dangerous extent every season is in a way unfortunate, as it tends to cause many growers to become lax in their spraying operations. Two or three seasons relatively free from leaf-spot are usually enough to produce this effect with many growers. In many districts during 1922 leaf-spot caused heavy losses and these losses were almost entirely avoidable, as it has been definitely proved that leaf-spot can be effectively controlled, even when in epidemic form, if proper spraying is done. Many growers, who had the reputation of doing their work thoroughly suffered heavily from leaf-spot injury. The natural thing to do under such circumstances was to locate the trouble and as most fruit growers are quite human, they did not think of laying the trouble at their own door.

It was even suggested that the materials generally used were not right, that the schedule of applications as generally recommended was wrong, and so on. If the facts could have

(Continued on page 13.)

IN MEMORIAM

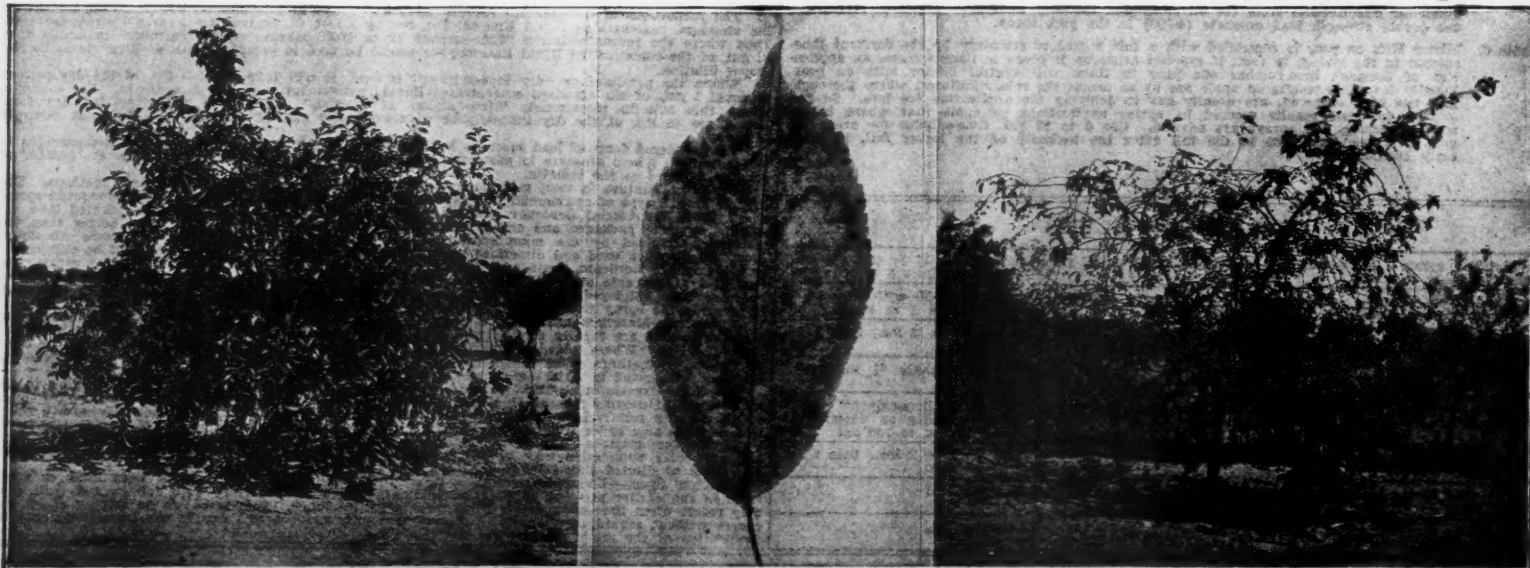
JUST as we are going to press it becomes our painful duty to announce to the readers of the AMERICAN FRUIT GROWER MAGAZINE the passing away of its managing editor, Claude I. Lewis, following an illness of about four months, during the greater part of which he was confined to his bed. Words fail us in expressing the bereavement which we feel and which we know our readers will feel over the loss of Mr. Lewis, who has for many years past been one of the most prominent figures in American horticulture. He was a man of sterling character, of great ability and of wide and varied knowledge in his chosen line.

The work of Mr. Lewis, however, lives after him. Like a star of the first magnitude, whose light would continue to reach the earth for decades even though it disappeared from its place in the heavens, the influence of Mr. Lewis will be felt for many years to come; and the AMERICAN FRUIT GROWER MAGAZINE will continue to reflect it. During his illness, and up to the very last, Mr. Lewis maintained editorial direction of the paper; and, with the freedom from office interruptions, he was able to lay out the issues of the AMERICAN FRUIT GROWER MAGAZINE for the entire year 1924, as well as to dictate letters arranging for contributions by specialists on each of the subjects provided for. There will consequently be no change in the policy or general composition of the AMERICAN FRUIT GROWER MAGAZINE, and its articles will be no less authoritative than they have been in the past. His successor as managing editor will also be a man worthy to take the place of Mr. Lewis; and, with the amount of work already done in advance for the coming year, he will be able to spend more time in traveling among the fruit growing districts and adding measurably to the service which the AMERICAN FRUIT GROWER MAGAZINE is endeavoring to perform. We feel that in this way the memory of Mr. Lewis will be best honored and his dearest wish fulfilled.

is not being planted extensively at the present time. Montmorency is quite susceptible but not so much so as English Morello. This disease is known by a number of common names, as leaf-spot, leaf-blight, yellow-

usually confined to the leaves, and it is here that the real injury is done.

The fungus is carried over winter on old leaves which were affected the previous year and the first serious infections come from them soon after



Left—A tree which has been properly sprayed and has held its foliage in good condition. Center—A cherry leaf as it appears when about ready to drop after injury by leaf-spot. Right—A tree which has been poorly sprayed; the leaves have fallen and the fruit is worthless.

Servant of the Millions

FOUNDED on the principle that a business earns the right to exist only as it serves, the Ford organization has grown to be more than a business.

It is an institution that serves the millions.

Ford service through 33,912 stations in America reaches out to every one of the Ford Cars, Ford Trucks and Fordson Tractors on every street, highway and farm the length and breadth of the land.

The nearest service to every farm is Ford service—a very good reason for standardizing on Ford equipment.

Ford Motor Company

CARS · TRUCKS · TRACTORS

Ask Any Ford Dealer

Ford
THE UNIVERSAL CAR



Part of Woodward Avenue frontage of the mammoth Highland Park plant of the Ford Motor Company, largest Automobile factory in the world

General Spray Calendar for Apples, Pears, Quinces

for the Middle West

By T. J. Talbert, University of Missouri

What to Spray for	When to Spray.	What to Use
(1) San Jose Scale. Other scale insects. Plant Lice (Aphids).	Any time after leaves drop in the fall, during pleasant weather in winter and until growth starts in spring.	Dormant or Scale Spray. Commercial liquid lime-sulphur 1 to 7 or miscible oils. This spray may be omitted if scale is not present. Arsenate of lead is not required.
(2) Plant Lice (Aphids). Apple Scab. Curculio. Canker Worms. Apple Rust. Leaf Spot. Other biting insect.	When cluster buds are separated and the pink petals show, but before the blossoms open.	First Summer or Cluster Bud Spray. Lime-sulphur (1½ to 50) see note, plus 1 lb. of dry arsenate of lead. Nicotine sulphate (½ pt. to 50 gal. of spray mixture when plant lice are abundant).
(3) Codling Moth. Plant Lice (Aphids). Apple Scab. Leaf Spot. Curculio. Canker Worms. Lesser Apple Worm. Other biting insect.	Start when bloom is two-thirds off and finish before the blossom ends close. Most important summer spray, apply thoroughly.	Second Summer or Calyx-Cup Spray. Lime-sulphur (1½ to 50) see note, plus 1 lb. of dry arsenate of lead. Nicotine sulphate (½ pt. to 50 gal. of spray mixture when plant lice are abundant).
(4) Apple Blotch. Sooty Blotch. Leaf Spot. Curculio. Codling Moth. Lesser Apple Worm. Other biting insect.	Within 12 to 14 days after Calyx spray. If Curculio injury is severe apply within 6 or 7 days.	Third Summer or Curculio and Blotch Spray. Lime-sulphur (1½ to 50) see note, plus 1 lb. of dry arsenate of lead. If apple blotch is severe use Bordeaux 3-4-50.
(5) Apple Blotch. Sooty Blotch. Curculio. Codling Moth. Lesser Apple Worm. Other biting insect.	Apply 5 or 6 weeks after the Calyx spray, or if No. 4 is made within 6 to 10 days, apply No. 5, 2 to 3 weeks later.	Fourth Summer Spray. Lime-sulphur (1½ to 50) see note, or Bordeaux 3-4-50, plus 1 lb. of dry arsenate of lead. If apple blotch is severe, use Bordeaux 3-4-50.
(6) Codling Moth. Lesser Apple Worm. Apple Blotch. Bitter Rot. Sooty Blotch. Curculio. Other biting insect.	Apply about 2 or 3 weeks after No. 5 or 7 to 9 weeks after Calyx spray. Make later sprays at intervals of 10 days or 2 weeks, where apple blotch or bitter rot is serious.	Fifth Summer Spray. Lime-sulphur (1½ to 50) see note, or Bordeaux 3-4-50 plus 1 lb. of dry arsenate of lead. If apple blotch or bitter rot is serious use Bordeaux 3-4-50.

Lime Sulphur Solution.—Where spray guns are used it may be advisable to dilute the lime sulphur at the rate of 1½-50 on account of danger of burning foliage and fruit. Lime-sulphur as referred to in the spray calendar means commercial solution testing about 33 degrees Baume. Lime-sulphur is more apt to burn in dry, hot weather while Bordeaux is most dangerous in cool, cloudy weather.

Blotch and Bitter Rot.—If the orchard is practically free from blotch and bitter rot, lime-sulphur solution may be used instead of Bordeaux in Nos. 4 and 5.

Sprays Required.—All the above sprays are not likely to be needed. A study of the insects and fungus diseases common in the orchard will help the grower arrange a schedule adapted to his particular needs. The sprays ordinarily needed are 2, 3, 4 and 5 in the northern half of Missouri, while in the southern half 5 or more sprays are generally required.

Bordeaux Mixture.—Bordeaux has reference to Bordeaux mixture made according to the 3-4-50 formula (3 lbs. bluestone, 4 lbs. quick lime to 50 gal. of water).

BORDEAUX MIXTURE

The following formula for making Bordeaux mixture has given very satisfactory results in spraying demonstration work:

Blue vitriol (copper sulphate).....	3 lbs.
Stone lime (unslaked).....	4 lbs.
Water	50 gal.

If only 50 gal. of the Bordeaux is to be made, dissolve the copper sulphate or bluestone in 2 or 3 gal. of water. Hot water will hasten the dissolving of the bluestone. Make the solution up to 25 gal. by adding water. Shake the lime in another container and make it up to 25 gal. with water. The two solutions should be kept separate until ready for use, when they should be poured together at the same time through a strainer into the spray barrel or tank. Bluestone may be easily dissolved over night by placing the amount needed in a gunny sack and suspending it in a barrel just beneath the water.

Since the copper sulphate solution injures iron or tin containers, it should be prepared in stone or wooden vessels.

Where greater quantities of Bordeaux are to be made, the work may be greatly facilitated by dissolving and slaking larger amounts of copper sulphate and lime. Stock solutions containing 2 lbs. of copper sulphate and 2 lbs. of lime to the gallon may be prepared in separate barrels, or other containers, and kept for an indefinite period, if evaporation is prevented.

The most satisfactory way, however, of preparing large quantities of Bordeaux is by means of an elevated platform higher than the spray tank. On this platform may be placed the stock solution containers, dilute solution containers and other needed equipment. By elevating the stock solutions and connecting the containers by means of pipes, the mixing may be easily made by gravity. Water should also be supplied by a tank or pump.

Arsenate of Lead Paste.—The paste form of arsenate of lead may be used instead of arsenate of lead powder or the dry form. For all practical purposes, one form is as effective as the other. Since the arsenate of lead paste is 50% water, use twice the amount recommended for the dry form. Most orchardists now prefer to use the dry arsenate of lead.

General Spray Calendar for Peaches, Cherries and Plums

What to Spray For.	When to Spray.	What to Use.
(1) Peach Leaf Curl. Brown Rot. San Jose Scale.	Any time after leaves drop in fall, during nice weather in winter and until just before growth starts in spring.	Commercial lime-sulphur (1 to 7). If scale is not present, use Bordeaux mixture (4-4-50) or lime-sulphur solution (2 to 50).
(2) Curculio. Other biting insect. Peach Scab. Cherry Leaf Spot. Brown Rot. Plant Lice (Aphids).	Apply after blooming and when most of the shucks and blossoms are off the fruit.	Arsenate of lead dry ¼ lb. in self-boiled lime-sulphur (8-8-50), or in 50 gal. of water to which is added milk of lime from 2 to 3 lbs. of stone lime. Add nicotine sulphate ½ pt. to 50 gal. spray if plant lice are injurious.
(3) Curculio. Other biting insect. Brown Rot. Peach Scab. Cherry Leaf Spot. Plant Lice (Aphids).	Apply 6 to 10 days after shucks and blossoms are off. If curculio is not serious, 2 weeks after shucks and blossoms are off.	Self-boiled lime-sulphur (8-8-50) plus ¼ lb. of dry arsenate of lead.
(4) Curculio. Other biting insect. Brown Rot. Peach Scab. Cherry Leaf Spot.	Apply 2 to 3 weeks after No. 3 or at least 3 weeks before fruit ripens.	Self-boiled lime-sulphur (8-8-50) plus ¼ lb. dry arsenate of lead.

Explanation of Spray Calendar for Stone Fruits.—Where San Jose scale and Peach Leaf Curl are not present, sprays No. 2 and No. 3 will generally afford sufficient protection.

During wet season, Elberta and later varieties of peaches may need later applications of self-boiled lime-sulphur (8-8-50), but in no instance should any variety of stone fruit be sprayed with this mixture later than 3 weeks before picking time.

Preparation of Self-Boiled Lime-Sulphur:

Good stone lime (not air-slacked).....	8 lbs.
Flowers of sulphur.....	8 lbs.
Water	50 gal.

Place lime in a barrel or vat. Add a bucket of water to start slacking. When slacking is well started, add another bucket or so of water, then add the sulphur. Keep lime and sulphur well stirred to prevent caking. Add water as needed to keep the mixture from drying or burning. When slacking ceases, add water to make up to 50 gal. Strain into spray barrel or tank.

Amount of Spray Needed for Trees of Various Ages.—The amount of spray required for each tree will depend upon the size of the tree and the thoroughness of the spraying work. In general the amount needed per tree for apple, pear, peach, plum and cherry trees does not differ greatly until the trees are about 10 years old. After this age is reached the apple trees will usually need from 1 to 6 or 7 gal. more spray per tree than the pear, peach, plum or cherry. Trees from 1 to 3 years old will require approximately ¼ to 1 gal. each; trees 3 to 5 years, ½ to 2 gal. each; trees 5 to 7 years, 2 to 3 gal. each; trees 7 to 10 years, 3 to 4½ gal. each; trees 10 to 14 years, 3½ to 5 gal. each; trees 14 to 18 years, 4 to 7 gal. each; trees 18 to 24 years, 5 to 10 gal. each; trees 24 years old or over may require from 8 to 14 gal. each.

How to Calculate Amount of Spray Materials to Buy.—Dormant or Scale Spray.—To determine the amount of lime-sulphur to purchase, multiply the number of trees about the same age by the amount per tree as estimated above. Then multiply this by the number of sprays to be made, and divide the total by 350. The result will be the number of 50-gal. barrels of concentrated lime-sulphur solution that should be purchased. A 50-gal. barrel of lime-sulphur solution diluted at the rate of 1 gal. of the concentrated solution to 7 gal. of water will make approximately 350 gal. of spray.

Lime-Sulphur for Summer Sprays.—A 50-gal. barrel of lime-sulphur solution diluted at the rate of 1½ gal. of the strong solution to 50 gal. of water will make approximately 1700 gal. of spray. To find the quantity of lime-sulphur required, calculate as indicated above by multiplying the number of trees about the same age by the amount estimated per tree. Then multiply by number of sprays to be made and divide by 1700. This will give the number of barrels to be purchased for the summer sprays.

Arsenate of Lead.—Multiply the number of trees of the same age by the estimated amount of spray needed for each tree, then multiply this by the number of sprays to be made and divide by 50. This will give the number of 50-gal. lots required. Now multiply this by 1, 2 or 3, depending upon the pounds of dry arsenate of lead or paste arsenate of lead, you expect to use for each 50 gal. of spray. The product obtained will give the number of pounds arsenate of lead to purchase.

PRACTICAL HINTS TO REMEMBER IN SPRAYING APPLE TREES

1. Weigh or measure accurately all spraying materials and use them according to directions. If it is desired to experiment, do it in a small way and remember that at least three or four seasons' results should be secured before the practice is adopted for the whole orchard.

2. Apply the sprays at as nearly the proper time as possible and remember that the leaves and fruits are not protected unless they have been thoroughly covered with the spray. Unsatisfactory results are more often due to poor spraying than to other factors.

3. Apply the spraying mixtures as soon as possible after they are diluted and mixed for use. If any of this spraying solution is left in the spray barrel or tank after the work is finished, pour it out or use it in respraying a few trees. It is not advisable to keep the diluted and mixed spraying solution until time for the next application. Chemical changes may occur in the lime-sulphur arsenate of lead or bordeaux arsenate of lead solution after standing for a time and if applied to apple trees it may rust or burn the fruit and foliage badly.

4. Use the standard spraying mixtures until you are convinced, either by your own observation or by the observations and experiments of the College of Agriculture that the new materials are equally as good or better than the old.

5. Know when to spray, what to use, how to apply the spray to the best advantage and what insects and diseases it is necessary to control.

6. Before the spraying season begins, secure enough spraying materials for at least two applications. This is necessary because there is only about seven to ten days' time between the first and second summer sprays. Delays in ordering spray materials may mean the loss of a fruit crop.

7. Spraying materials if properly mixed, diluted and applied seldom do material injury to the leaves or fruit. Where injury is observed, however, study it carefully and be sure that the spray mixture is at fault before making radical changes in the spraying solution. Frost injury, fire blight, black rot and other factors that may do harm are often mistaken for spray-burn injury.

8. Use spraying equipment capable of doing the work required. Needed spraying accessories, such as better nozzles, spray rods and hose may mean the success or failure of the spraying work.

9. The practice of employing someone to spray the orchard often results in considerable expense and unsatisfactory fruit. It is usually advisable to spray your own orchard or lease it upon a share or cash basis.

10. Clean the spray tank or barrel, hose, rods and nozzles after each spraying by pumping clean water through them. Detach or oil the metal parts of the outfit which are apt to be difficult to adjust or remove as a result of the action of the spray.

11. To prevent injury to the face and hands from contact with the spraying solution, smear a heavy coat of vasoline on the face, wear a slouched hat and a pair of mule-skin gloves, which should be kept thoroughly coated with axle grease.

12. In applying the third, fourth and later summer sprays, if the weather is hot and bright the lime-sulphur solution may burn the fruit. Under such conditions Bordeaux 3-4-50 and arsenate of lead is recommended. It is also true that Bordeaux is more apt to burn during cloudy, cool weather than lime-sulphur.

13. The recommendations made in this publication are adapted as far as possible to the general conditions prevailing in the fruit-growing sections of Missouri. Every fruit grower should study carefully, however, the conditions in his own orchard, including the insect pests and plant diseases, in order to be able to work out a spraying program best adapted to his own particular needs.

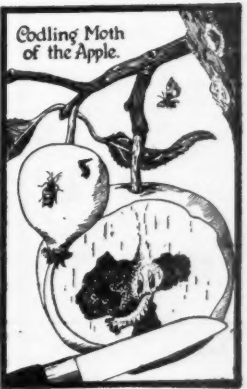
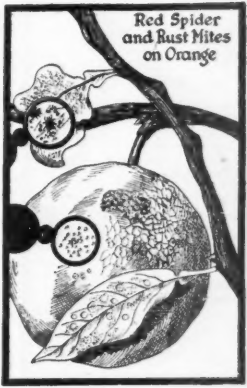
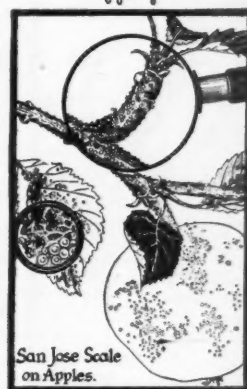
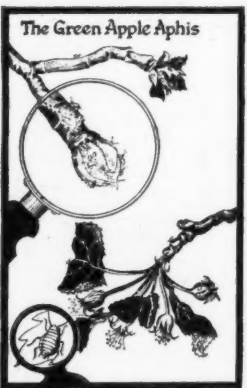
NEW OIL SPRAYS FOR SAN JOSE SCALE CONTROL

The method of preparing engine oil emulsions for use as sprays is described by Ackerman in the United States Department of Agriculture Circular 263, and by Haseman and Sullivan in Missouri Agricultural Experiment Station Circular 100. The oil, water and soap are heated to boiling and emulsified by pumping. Oil emulsions made as described in these publications are said to be made according to the "government formula." If used with hard water, or with lime-sulphur, such emulsions break down and free oil arises to the surface of the spray mixture. The separation of free oil may be prevented by the addition of Bordeaux mixture, copperas-lime mixture, starch, flour, soap, glue, casein, "Kaysol" and other substances.

In the course of experimental work by the department of horticulture of the Missouri Agricultural Experiment Station, at Columbia, it has been found that oil emulsions can be made without the potash fish-oil soap, and without heating. The materials which have been used as stabilizers have been found to act as emulsifiers, just as the soap does.

Inasmuch as the Missouri cold emulsions can be prepared more cheaply and easily than the oil-soap emulsions, they are very promising as a spray for the control of San Jose Scale. Missouri Agricultural Experiment Station Bulletin 205 (1923) by A. M. Burroughs, presents the results of one year's work with the Missouri cold emulsions and gives directions for their preparation and use in order that fruit growers who so desire may give them a trial.

S-W SPRAYING GUIDE



FRUIT or VEGETABLE	PEST	WHAT TO USE	DILUTION	WHEN TO SPRAY
APPLE	San Jose Scale	Dry Lime-Sulfur	12 to 15 lbs.	In fall after leaves drop or in spring when buds are showing "up-green."
	Codling Moth	Dry Arsenate of Lead	1 to 1½ lbs.	(1) At fall of the blossoms before the calyx closes. (2) Three weeks after fall of blossoms. (3) Ten weeks after fall of blossoms. (4) Fourteen weeks after fall of blossoms. (5) Seventeen weeks after fall of blossoms.
	Cankerworm	Dry Arsenate of Lead	1 to 2 lbs.	(1) Just before blossoms in cluster-bud. (2) At fall of blossoms.
	Bitter-Rot	Fungi-Bordo	8 lbs.	Spray about the middle of June and keep fruit coated the rest of the season.
	Blotch	Dry Lime-Sulfur or Fungi-Bordo	3 to 4 lbs. 8 lbs.	(1) Three weeks after fall of blossoms. (2) Five weeks after fall of blossoms.
	Scab	Dry Lime-Sulfur	3 to 4 lbs.	(1) Just before blossoms in cluster-bud. (2) At fall of blossoms. (3) Within a week or ten days later.
	Fruit Tree Leaf Roller	Spr-Mulsion	4 to 5 gals.	Prior to but as near hatching time of eggs as possible. Before buds open.
	Powdery Mildew	Dry Lime-Sulfur	3 to 4 lbs.	(1) When bud clusters begin to show pink. (2) At fall of the blossoms. (3) About 15 days later.
	Anthraxnose	(1) Fungi-Bordo (2) Fungi-Bordo	(1) 6 to 8 lbs. (2) 10 to 12 lbs.	(1) Before the fall rains begin. (2) After the crop is picked.
	Aphis	(1) Spr-Mulsion and Nicotine Sulfate (2) Spr-Mulsion and Nicotine Sulfate	(1) 3 to 4 gals. (2) 1 to 1½ gals. ¼ pint	(1) In fall after leaves drop or in spring before buds open. (2) As soon as discovered—about the time when first leaves are unfolding.
APRICOT	Apricot Brown Rot	Fungi-Bordo	10 to 12 lbs.	(1) Important to spray just as first blossom buds are opening. (2) When trees are about one-fourth in bloom.
	Brown Apricot Scale	Spr-Mulsion	3 to 4 gals.	In fall after leaves drop or in spring before buds swell.
	Apricot Worm	Dry Lime-Sulfur or Dry Arsenate of Lead	12 to 15 lbs. 1 lb.	Just before buds open.
PEACH	Sheet Hole Fungus	Fungi-Bordo	8 to 10 lbs.	In fall after leaves are off.
	Curculio	Dry Arsenate of Lead and Lime	1 lb. 3 lbs.	(1) When first shucks are pushing off. (2) Again when all shucks are off. (3) Three or four weeks after fall of blossoms.
	Brown Rot	Self-Bottled Lime and Sulfur	8 lbs. of each	(1) When all shucks are off. (2) Three or four weeks after fall of blossoms. Should weather turn damp and warm near ripening time keep fruit well coated with spray.
	Scab	Self-Bottled Lime and Sulfur	8 lbs. of each	Spraying for Brown Rot controls Scab.
	Leaf Curl	Dry Lime-Sulfur	12 to 15 lbs.	Either in fall after leaves drop or in spring before buds swell.
	Peach Blight	Dry Lime-Sulfur or Fungi-Bordo	12 to 15 lbs. 8 to 10 lbs.	In fall after leaves drop—before December 15th.
PEAR	Twig Borer	Dry Lime-Sulfur	12 to 15 lbs. 4 to 5 gals. 1 lb. of Lead 1 lb. of Lime	Same as for Leaf Curl.
	Slug	Dry Arsenate of Lead	1 lb.	When slugs appear.
PLUM	Pear Leaf-Blister Mite	Dry Lime-Sulfur	12 to 15 lbs.	In fall after leaves drop or in the spring before buds burst.
	Scab	Dry Lime-Sulfur	3 to 4 lbs.	(1) Just before bloom, cluster-bud. (2) At fall of blossoms. (3) Two weeks later.
PRUNE	Curculio	Dry Arsenate of Lead	1 lb.	(1) Just before blossom buds open. (2) At fall of blossoms. (3) A week later.
	Brown Rot	Dry Lime-Sulfur	3 lbs.	(1) Just before buds open. (2) Immediately after blossoms fall. (3) Ten days to two weeks later. If season is wet, spray every two weeks until month before picking time.
	Leaf Spot	Dry Lime-Sulfur	3 lbs.	(1) Ten days after fall of blossoms. (2) Three weeks later. (3) Six weeks after fall of blossoms.
CHERRY	Brown Apricot Scale	Spr-Mulsion	3 to 4 gals.	In fall after leaves drop or in spring before buds swell.
	Italian Pear Scale	Spr-Mulsion	3 to 4 gals.	Same as for Brown Apricot Scale.
	Moss and Lichens	Spr-Mulsion and Caustic Soda	3 to 4 gals. 1 to 2 lbs.	Same as for moss—when trees are dormant. Dissolve caustic in the water first, then add Spr-Mulsion.
	Thrips	Spr-Mulsion and Nicotine Sulfate	1 to 1½ gals. ¼ pint	Same as for Pear.
GRAPE	Red Spider	Dry Lime-Sulfur	3 to 4 lbs.	When spiders appear in numbers about July.
	Cherry Slug	Dry Arsenate of Lead	1 lb.	When slugs appear.
	Curculio	Dry Arsenate of Lead	1 lb.	(1) At fall of blossoms. (2) A week to ten days later.
	Brown Rot	Dry Lime-Sulfur	3 to 4 lbs.	(1) Just before the blossoms. (2) At fall of blossoms. (3) A week to ten days later. (4) When fruit begins to color.
CURRANT and GOOSEBERRY	Rose Chafer	Dry Arsenate of Lead and Molasses	2 lbs. 1 gal.	At first appearance of beetles and one week later if beetles are still present.
	Grape Berry Moth	Dry Arsenate of Lead	1½ lbs.	(1) Just before fruit sets. (2) About ten days later. (3) Mid-July.
	Black Rot	Fungi-Bordo or Potray	8 lbs. 9 lbs.	(1) When second or third leaf is showing. (2) Before the blossoms open. (3) After fall of blossoms. (4) About ten days to two weeks later. (5) Again in ten to fourteen days.
	Powdery Mildew	Dusting Sulfur		(1) When shoots are 9 to 12 inches long. (2) After blooming and fruit has set.
	Sphinx Moth	Dry Arsenate of Lead	1 to 1½ lbs.	Early in June as larvae appear.
STRAWBERRY	Curculio	Dry Arsenate of Lead	1 to 1½ lbs.	When worms first appear.
	Powdery Mildew	Dry Lime-Sulfur	3 lbs.	(1) When buds begin to open. (2) At ten-day intervals until five applications have been made.
RASPBERRY	Leaf Roller	Dry Arsenate of Lead	1½ lbs.	A week after moths appear.
	Leaf Spot	Fungi-Bordo	8 lbs.	(1) Before blossoms open. (2) Ten days to two weeks later.
POTATO	Anthraxnose	Dry Lime Sulfur	4 lbs.	(1) When new shoots are six inches high. (2) When ten inches high. (3) Just before bloom.
	Colorado Potato Beetle	Tuber Tonic or Potray	3 lbs. 9 lbs.	Begin when plants are six inches high and thereafter at 10-day intervals until 4 or 5 sprays have been applied.
BEAN	Leaf-Hopper	Arsenate of Calcium	1 Part 4 Parts	When beetles and eggs appear, apply as a dust
	Blight	Dusting Sulfur		While original seed parts are still on seedlings.
TOMATO	Toxoto Worms	Fungi-Bordo	8 lbs.	When worms appear.
	Leaf Spot	Dry Arsenate of Lead	1 to 1½ lbs.	At setting time and at two-week intervals up to picking season.
ONION	Thrips	Nicotine Sulfate and Soap	¼ pint and 2½ lbs.	Spray frequently in crevices of plants.
	Mildew	Fungi-Bordo	8 lbs.	Spray frequently.
CABBAGE and CAULIFLOWER	Cabbage Worms	Dry Arsenate of Lead and Soap	1 lb. 8 to 6 lbs.	When worms appear.
ASPARAGUS	Asparagus Beetle	Dry Arsenate of Lead	6 lbs.	Leave every tenth row uncult and spray from both sides. Apply three or four sprays at frequent intervals.
BEET	Leaf Spot	Fungi-Bordo	6 lbs.	Early in spring when plants are small.
CELERY	Early and Late Blight	Fungi-Bordo	6 lbs.	Spray frequently.
CUCUMBER	Striped Cucumber Beetle	Potray	7 lbs.	Spray frequently to repel beetles.
EGGPLANT	Flea Beetle	Potray	7 lbs.	Frequent application.
MUSKMELON or CANTALOUPE	Aphis	Nicotine Sulfate	¼ pint	When lice appear. Spray undersides of leaves.
PEPPER	Rot	Fungi-Bordo	6 lbs.	Spray two or three times during fruiting season.

All dilutions on basis of amount per 50 gallons of spray.

SHERWIN-WILLIAMS
INSECTICIDES

SAVE THIS GUIDE!

Have it handy for reference. It tells exactly the right Insecticide and Fumicide to use for each trouble. Send now for a free copy of the remarkable book: "The Truth About Sherwin-Williams Dry Lime-Sulfur."

The Sherwin-Williams Co., Dept. B 458, 640 Canal Rd., N. W., Cleveland, Ohio



Spray Table for Northern California

By Warren P. Tufts, Assistant Professor of Pomology, University of California

(NOTE: The following material is largely summarized from Circular No. 227 of California College of Agriculture, by Horne and Essig)

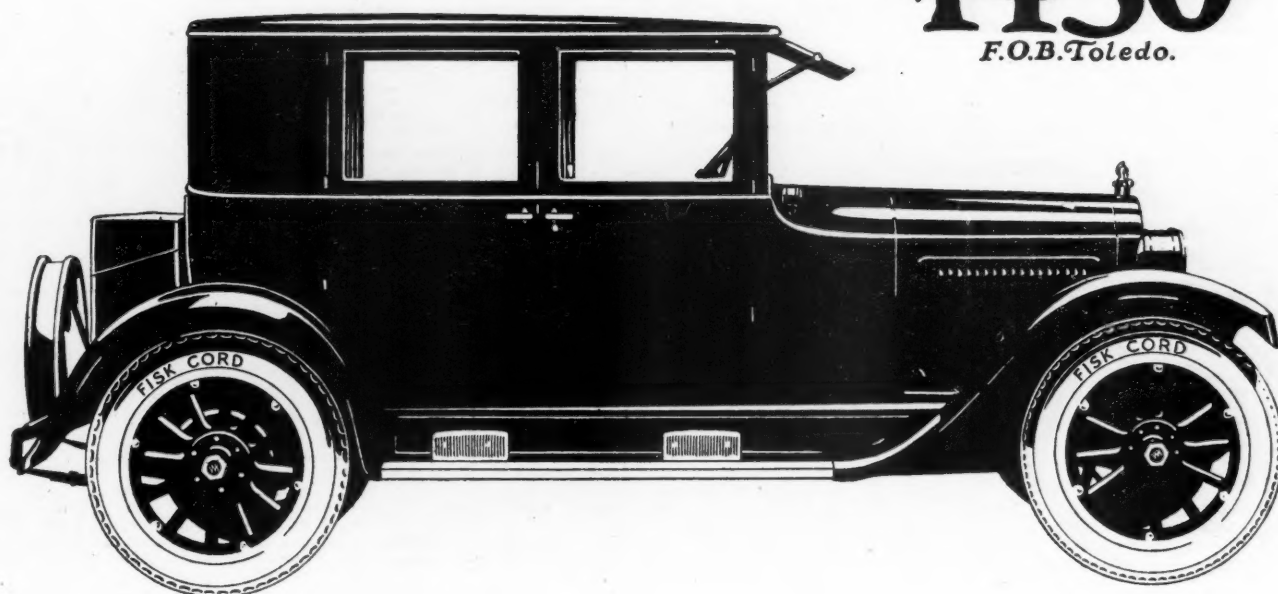
ALMOND				CHERRY			
What to Spray For.	What to Use.	When to Spray.	Remarks.	What to Spray For.	What to Use.	When to Spray.	Remarks.
Shot Hole Rust.	Lime-sulphur 1-10.	Just as buds are swelling.		Bacterial Gum-mos.	See under "Apricot."		Spraying ineffective.
Calif. Peach Borer.	See under "Peach."			Leaf and Fruit Spot (Shot Hole).	See under "Apricot."		
Peach Twig Borer.	See under "Peach."			Black Cherry Aphid.	(1) Nicotine sulphate, 1 pt.; fish oil soap, 4 to 5 lbs.; 100 to 150 gal. water or dust with 5% Nicodust.	As soon as aphids appear.	Dusting must be thorough.
Red Humped Caterpillar.	See under "Prune."			Cherry Fruit Sawfly.	Powdered arsenate of lead, 3 lbs. to 100 gal. water.	When petals are opening.	
Red Spider.	(1) Lime-sulphur 1 to 10 or crude oil emulsion. (2) Lime-sulphur 1 to 50 or sulphur paste 8 to 21 lbs. to 100 gal. water.	(1) During dormant season when trees are leafless. (2) As soon as mites appear and as often as necessary during the summer.	(1) To kill eggs of the Bryobia. Crude oil emulsion most effective. Distillates and miscible oils not effective. (2) To kill adults of the Tetranychus.	Cherry Slug.	(1) Powdered arsenate of lead, 2 lbs. to 100 gal. water. (2) 2 to 5% Nicodust.	When slugs appear.	An easy insect to control.
APPLE				FIG			
Pear Blight.	See under "Pear."		Spraying ineffective.	Smut.	No remedy known.		
Mildew.	Lime-sulphur 1 to 35 or sulphur paste 8 lbs. to 100 gal. water.	When petals fall. Several times throughout the spring.	Sulphur sprays cause injury to apple trees in some sections of California. Cut out all diseased twigs at pruning time.	Scouring and Splitting.	Due to unfavorable atmospheric or soil moisture conditions.		
Scab.	(1) Bordeaux 5-5-50 or lime-sulphur 1-20. (2) Lime-sulphur, 1-35.	(1) As blossoms open. (2) As petals fall.	Later sprayings may be necessary in coastal sections.	Mediterranean Fig Scale.	Distillate Emulsion or miscible oil or crude oil emulsion.	During dormant season.	
Codling Moth.	(1) 2½ lbs. powdered arsenate of lead to 100 gal. water. (2) Same strength as No. 1. (3) 2 lbs. powdered arsenate of lead to 100 gal. water.	(1) As petals fall. (2) Three weeks later. (3) As needed.	In many sections of California 2 sprays are sufficient. In other locations, 4 or 5 sprays are necessary. Watch for new larvae and spray accordingly. Time varies according to locality.	GRAPE			
Flat Headed Apple Tree Borer.	Borers only attack sunburned or other dead areas.		Spraying ineffective. White wash trunks to prevent sunburn. Tree protectors more efficient.	Grape Mildew.	Finest forms of dry sulphur.	When new shoots are 6 in. long, and again just before the blossoms open.	In cool or moist locations a third sulphuring when the grapes are as large as peas and a fourth when two-thirds grown.
Fruit Tree Leaf Roller.	Miscible oil spray.	During dormant season, when trees are leafless, to kill eggs.	Thoroughly drench limbs, particularly top and outside branches.	Calif. Grape Root Worm.	Powdered arsenate of lead, 3 lbs. to 100 gal. water.	As soon as beetles appear in spring.	Cultivate thoroughly close to vines during winter to kill larvae.
Green and Rose Apple Aphid.	(1) Lime-sulphur 1 to 10. (2) Nicotine sulphate 1 pt., fish oil soap 4 to 5 lbs., water 100 to 150 gal. (3) 5 or 6% Nicodust.	(1) Late dormant just before buds open. (2) From bursting of the buds until leaf buds are one-half inch long. (3) Same as No. 2.	(1) Fair results in killing eggs. (2) Results in somewhat better control than (1). (3) Dust thoroughly.	Grape Leaf Hopper.	(1) Nicotine and soap or nicotine sulphate, 1 lb.; liquid soap, ¼ gal.; water, 250 gal. (2) Thoroughly dust with 10% Nicodust.	(1) Before young nymphs develop wings. (2) When adults appear.	In place of 10% Nicodust may use 6% nicosulphur dust which latter will also control mildew.
Red Humped Caterpillar.	See under "Prune."			Grape Phylloxera.	Use resistant vines. Disinfect cuttings or rootings before planting by dipping in hot water, 122 degrees Fahrenheit for 5 min.		Spraying ineffective.
Scale Insects.	(1) Lime-sulphur 1 to 10. (2) Crude oil emulsion. (3) Distillate emulsion. (4) Miscible oil.	During dormant season, when trees are leafless.	For San Jose Scale alone lime-sulphur is sufficient. For a mixed infection of scales use an oil spray; the heavier oils are more efficient.	Mealy Bug.	Difficult to control but best results have been obtained by burning sulphur under a tent over the vines.		
Tussock Moth.	Destroy egg masses during winter. Jar from trees and prevent reascending by banding trees with cotton wire screen or tanglefoot.		Spraying ineffective.	OLIVE			
Woolly Apple Aphid.	Distillate emulsion or miscible oil.	During dormant season when trees are leafless.	For root form open up around trunk and pour in 4 to 5 gal. of spray. Delicious and Northern Spy roots are somewhat immune. See also under "Peach" Calif. Peach Root Borer.	Olive Knot.	Cut out thoroughly at first appearance and disinfect.		Spraying ineffective. Mission variety is more resistant than the Manzanillo and certain other varieties.
Bacterial Gum-mos.	Remove infected areas. Freely disinfect tools and wounds with 1 part mercuric cyanide, 1 part bichloride of mercury, 500 parts water.	Shave off outer bark for some distance and scrape to wood wherever cambium is killed.	Spraying ineffective.	Black Scale.	See under "Apricot."	Use distillate emulsion or miscible oil—stronger than for deciduous trees.	
APRICOT				PEACH AND NECTARINE			
Brown Rot.	(1) Bordeaux, 8-50. (2) Bordeaux, 4-50.	(1) When 1-5 of blossoms are open. (2) During full bloom or even after in bad cases if weather continues damp.	During fall and winter remove infested twigs and mummies. Sulphur sprays should be avoided, often causing small fruit.	Blight Leaf Curl.	(2) Bordeaux, 5-50. (2) Lime-sulphur 1 to 10.	(1) After first fall rains, Nov. 15 to Dec. 15. (2) Just as buds are showing green in spring.	Peaches cannot be sprayed after leaves appear with these sprays without injury. The fall spray is the most important for Blight; the spring spray for Leaf Curl.
Shot Hole (Peach Blight).	(1) Bordeaux, 5-50. (2) Bordeaux, 5-50.	(1) After first rains, Nov. 15-Dec. 15. (2) In spring when buds are showing pink.		Brown Rot.	See under "Apricot."		
Brown Apricot Scale.	(1) Crude oil emulsion or distillate emulsion or miscible oil.	During dormant season when trees are leafless, December to February.	Thoroughness of application is necessary. Do not spray before winter rains begin even if that is not before January or February.	Powdery Mildew.	See Apple Mildew.		
Calif. Peach Root Borer.	See under "Peach."			Black Peach Aphid.	Nicotine and soap or dust with 5% Nicodust.	As soon as insects appear.	
Fruit Tree Leaf Roller.	See under "Apple."			Black Scale.	See under "Apricot."		
Peach Twig Borer.	See under "Peach."			Brown Apricot Scale.	See under "Apricot."		
Red Humped Caterpillar.	See under "Prune."			Flat Headed Apple Tree Borer.	See under "Apple."		
				Peach Rust Mite.	Lime-sulphur 1 to 10.	During dormant season.	

(Concluded on page 12.)

WILLYS-KNIGHT

Coupe-Sedan

\$1450
F.O.B. Toledo.



America's Most Tempting Closed Car Value

By request of farmers and business men; a Willys-Knight Coupe-Sedan finished entirely in conservative, serviceable black!

With *washable* long-grain Spanish upholstery—long-wearing. A rugged car for every use. With all the famous Willys-Knight Coupe-Sedan conveniences and qualities. Doors both *front and rear*—easy in, easy out. A beautiful car on business-like lines—at a saving you can *feel in your pocket*.

Powered by the famous Willys-Knight sleeve-valve engine—the engine that actually improves with use. Owners report 20 miles and more to the gallon of gasoline—extreme oil economy—50,000 miles and more without a tool touched to this remarkable engine. Your Willys-Overland dealer will be glad to demonstrate.

WILLYS-OVERLAND, Inc., TOLEDO, OHIO
Willys-Overland Ltd., Toronto, Ont.

Other Willys-Knight models: 5-pass. Touring \$1175; 2-pass. Roadster \$1175; 7-pass. Touring \$1325; Coupe-Sedan De Luxe \$1550; 5-pass. Sedan \$1795; 5-pass. Sedan De Luxe \$1895; 7-pass. Sedan \$1995; all prices f. o. b. Toledo. We reserve the right to change prices and specifications without notice.

THE DAY OF THE KNIGHT IS HERE

Spray Table for Northern California

(Continued from page 10.)

PEACH AND NECTARINE—Continued

What to Spray For.	What to Use.	When to Spray.	Remarks.
Calif. Peach Root Borer.	Spraying ineffective. Use 1 oz. Paradi-chloroben-zene to the tree, spreading in a ring around the trunk, being careful to keep the material 3 in. from the trunk of the tree. Cover with 5 in. of soil mound-ing around trunk.	This remedy should be applied in the early fall before the ground becomes moistened.	Spraying ineffective. Increase the dosage for very large trees.
Peach Twig Borer.	Lime-sulphur 1 to 10.	As blossom buds begin to open	Addition of 3 lbs. powdered arsenate of lead per 100 gal. increases effectiveness.
Red Spider.	See under "Almond."		
San Jose Scale.	See under "Apple."		
Wheat Thrips.	See under "Pear."		

PEAR

Black End.	No remedy known. Give good care especially as to drainage.		In many cases lack of sufficient moisture may possibly be cause.
Blight.	Spraying ineffective. Cut out all affected parts thoroughly. Especially remove all "hold over" in limbs, trunk and roots during the winter. Disinfect tools and cuts freely; mercuric cyanide and corrosive sublimate 1 part of each to 500 of water in a mixture consisting of 3% glycerine and 1/4 water. In future plantings, topwork on resistant stocks.		New cankers in which cambium is not injured may be arrested by paring off the outer bark very thoroughly and applying the disinfectant. Large branches may usually be saved.
Scab.	Lime-sulphur 1 to 12 or Bordeaux 5-5-50.	(1) Just as cluster buds are opening. (2) Repeat when first blossoms are opening.	Later sprays may be necessary in moist localities.
Brown Apricot and other soft scales.	See under "Apricot."		
Cherry or Pear Slug.	See under "Cherry."		
Codling Moth.	See under "Apple."		
Fruit Tree Roller.	See under "Apple."		
Green Apple Aphis.	See under "Apple."		
Italian Pear Scale.	Crude oil emulsion or distillate emulsion or miscible oil.	During dormant season, January or February.	Crude oil emulsions are best. Thoroughly drench limbs and trunks.
Pear Leaf Blister Mite.	Lime-sulphur 1 to 10.	November or February.	In most sections the November or early December spray gives greater control than the February spray.
Pear Root Aphis.	See under Woolly Apple Aphis under "Apple."		Japanese pear root is more resistant to this pest than the French pear root.
Pear Thrips.	Distillate emulsion 10 gal., Nicotine 1 pt., water to make 200 gal. Or dust with 5 or 6 per cent Nicodust repeatedly.	As soon as "black" thrips appear in the blossoming buds as the latter begin to open. Spray as often as necessary.	Carefully watch buds for infestation prior to opening.
Red Humped Caterpillar.	See under "Prune."		
San Jose Scale.	See under "Apple."		Treatment for the Italian pear scale will also control San Jose Scale.

PLUMS AND PRUNES

Brown Rot.	See under "Apricot."		Not often serious.
Scale Insects.	See under "Apple and Apricot."		
Calif. Peach Root Borer.	See under "Peach."		
Cherry Fruit Saw-fly.	See under "Cherry."		

PLUMS AND PRUNES—Continued

What to Spray For.	What to Use.	When to Spray.	Remarks.
Citrus Red Spider.	See Red Spider under "Almond."		
Flat Headed Apple Tree Borer.	See under "Apple."		
Fruit Tree Leaf Roller.	See under "Apple."		
Italian Pear Scale.	See under "Pear."		
Mealy Plum Louse.	6 lb. fish oil soap to 100 gal. of water.	When insects appear in May and June.	Spraying must be done promptly before leaves are curled. The soap spray appears to give satisfactory results and is cheaper than the nicotine soap spray.
Peach Twig Borer.	See under "Peach."		
Pear Thrips.	See under "Pear."		
Red Spider.	See under "Almond."		
Red Humped Caterpillar.	1. 5 lb. powdered basic arsenate of lead, water 100 gal. 2. Dust with dry arsenate of lead, diluted with p.w.d. hydrated lime.	Whenever insects appear.	This pest is difficult to control. Close hoeing around trunks of trees during fall and spring will kill many hibernating larvae.
Tussock Moth.	See under "Apple."		

WALNUT

Blight.	No specific remedy. Plant resistant varieties.		
Codling Moth.	See "Apple." 1. Basic arsenate of lead 3 lbs. to 100 gal. water. 2. Or dust with powdered arsenate of lead and hydrated lime.	When the work of the insect is first observed in May and July.	Time of application depends upon climatic conditions.
Red Humped Caterpillar.	See under "Prune."		
Walnut Aphis.	Dust thoroughly with 2% Nicodust.	Last week of May or first part of June.	Sometimes second application is necessary in July or August.
Walnut Blister Mite.	Lime-sulphur 1-10.	When buds are swelling in spring.	Not a serious pest.

BUSH FRUITS (Blackberry, Loganberry, Raspberry)

Leaf Spot.	1. Bordeaux 5-5-50. 2. Lime-sulphur 1-10.	During dormant season.	Cut out and burn infected parts in fall. Renew old plantings. This disease sometimes confused with anthracnose which has not yet been identified in California.
Orange Rust.			Cut off diseased plantings below surface of the ground and burn. Bordeaux spraying is to prevent infection of healthy plants.
Raspberry Horn-tail.			Spraying ineffective. Cut off wilted tips as soon as noticed and burn. Remove all dead canes in winter, using care to dig out the borers at that time.
Rose Scale.	Distillate emulsion or miscible oil.	During dormant season.	Prune out old canes every year. Pest only serious where pruning is not regularly practiced.

CURRENTS AND GOOSEBERRIES

Mildew.	Lime-sulphur 1-33.	As buds commence to open and two or three times thereafter at intervals of 10 to 14 days.	In California use resistant varieties. Lime-sulphur 1-10, followed by a dusting with sulphur when the disease first appears has generally been effective.
Current and Gooseberry Fruitfly.			Spraying ineffective. Cultivate thoroughly during fall, winter and spring months.
Imported currant Borer.			Spraying ineffective. Cut out and burn all infected canes during the winter and remove the borers.
Red Spider.	Dust with sulphur or spray with wettable sulphur or sulphur paste.	When insects appear.	

STRAWBERRIES

Leaf Spot.	Bordeaux 5-5-50.	During dormant season.	Clean up and burn leaves in late fall. Spraying necessary only in cases where disease is serious.
Strawberry Aphis.	5% Nicodust.	When aphids appear.	Apply dust to under side of leaves. Defoliate plants in fall.
Strawberry Crown Moth.			Spraying ineffective. Be sure of clean nursery stock. Remove and burn infected plants as soon as discovered.
Strawberry Leaf Beetle.			Established infestations may be reduced by thoroughly spraying with powdered basic arsenate of lead 3 lb. to 100 gal. of water, or dust with 1 part of basic powdered arsenate of lead to 4 parts of powdered hydrated lime. It is a severe pest and should be eradicated if possible by destroying all infested vines.
Red Spider.			Thoroughly controlled with dry sulphur. However, this cannot be used on strawberries because of severe burning of the foliage. Very small amount of sulphur in ditches between rows affords some relief.

Notes on Spray Machinery

(Continued from page 3.)

that the nine or twelve-gallon capacity accredited to machines by their makers is not intended to represent their every-day performance, it is rather the maximum performance of the machine when everything functions 100 per cent. In daily operation, a grower should figure on a 15 to 30 per cent reduction from the catalog rating in pump delivery.

If you have not checked your pump

capacity recently, measuring the output of your nozzles in a pail or milk can will be worth while. If you get a seven and one-half or eight-gallon test from an outfit rated at nine and one-half gallons, you are getting good results. If your test falls below seven and one-half gallons, hold a watch on one of the pump cylinders, and count the number of strokes per minute. Then consult your catalog or book of directions and find the right pump speed for that model. If the pump is working too slowly, the engine may

be speeded up to advantage. If the pump speed is not at fault, examine your packing and cylinders for wear, then any other part of your outfit which might reduce the flow of liquid.

We cannot leave the subject of guns and their relation to spray machinery without referring to a popular notion about them. Many assume that because a stream of spray may be projected from them to a height of 26 or 28 feet, that thorough spraying can be accomplished in tall trees. In comparative tests at Hood River Ex-

periment Station, Hood River, Ore., it was found that guns and rods were equally effective up to a height of 22 feet in the tree. Above that height neither one was effective when operated from the ground. The common opinion that the gun has greater height range than the rod is apparently unfounded, according to this and other tests. This leads to the suggestion that the spraying tower, discarded by many with the advent of the gun, should be reinstated as an

(Continued on page 12.)

Cherry Diseases and Their Control

(Continued from page 6.)

been determined in each instance, there is little question but that the trouble could have been laid to one or more of the following conditions: First, applications were not made on time; second, the trees were not thoroughly sprayed; or, third, the trees were not sprayed often enough.

This all goes back, then, to the statement made earlier, that the failure of leaf-spot to develop seriously every year tends to cause laxness in control work and the grower unconsciously lets his standard of spraying drop. The same thing has happened with other fruits. The grape growers of southwestern Michigan had not been bothered with black-rot since 1917; many growers sprayed less and less each year until in 1922 an epidemic of black-rot developed and the growers who had become lax suffered heavy losses from it. It was fortunate, however, for both the grape and cherry growers that there were that year demonstrations by experiment stations and by wide-awake growers that thorough spraying is still effective.

Effects of Defoliation by Leaf-spot.

The loss of leaves as a result of injury by leaf-spot may affect the trees in one or more of several ways, here noted:

First, if defoliation is heavy early in the season the fruit will never mature to a marketable condition. The first result, then is an immediate one which affects the crop of the current season.

Second. Defoliated trees are greatly in danger of being killed during the succeeding winter, if conditions are severe.

Third. If the trees are not killed during the winter, the crop for the succeeding year will be greatly reduced, and

Fourth. The vigor of the trees is so lowered that they will form very few lateral leaf buds, which means that there will be little development of spurs and if lateral spurs are not developed, the fruiting area of the tree is rapidly reduced and pushed to the outer surface of the tree.

It can be seen at a glance that severe defoliation may mean the loss of the current season's crop, the possible death of the trees during the winter, or if the tree does not die, the crop will be reduced during succeeding years.

Methods of Controlling Brown-Rot and Leaf-Spot.

There are two general methods of attack in controlling brown-rot and leaf-spot. The first consists of disposing of all old leaves and fruit which may carry the fungus over from one season to another. In the case of brown-rot, any old mummies which hang to the trees should be knocked or picked off and they, with any that are on the ground, should be buried several inches under the ground. This should be done before the blossoms open. The leaves, which harbor the leaf-spot fungus should be plowed under also, and this may be accomplished at the same time that the brown-rot mummies are disposed of. Controlling diseases by sanitary or clean-up methods is very good in theory and should not be neglected, but complete control cannot be hoped for as a few leaves or a few mummies will be left so that there is always a source of infection.

Spraying.

Spraying is by far the most important means of controlling these diseases and should never be neglected or done in a half-hearted way as there is no known way of predicting just what the conditions will be during any given season.

There is a wide difference of opinion as to the best spraying material to use on cherries. In some districts, Bordeaux is the favorite, in others, lime-sulphur is used more. It frequently happens that one grower will

(Continued on page 24.)

Why, Without Realizing It, You May Need

for Economical Transportation



There are three main groups of prospective buyers of Chevrolet automobiles and commercial cars.

First, are all who know from comparisons or through the experiences of friends that Chevrolet provides the utmost dollar value in modern, economical transportation of people or merchandise. This group constitutes our spontaneous market; its members walk right into our dealers' places of business and buy Chevrolet cars.

Second, the large group of people with modest incomes who have the false impression that so good a car as Chevrolet is beyond their means.

They do not realize that due to engineering excellence and full modern equipment, Chevrolet operating and maintenance costs average so low that during the life of the car, it delivers modern, com-

fortable, fast transportation at the lowest cost per mile, including the purchase price.

The tremendous growth of our business during the last two years has been due to the shifting of thousands from this group to the first group.

Third, the smaller but very important group of people of ample means, able to buy the highest priced cars, only a small percentage of whom as yet realize that Chevrolet combines quality features of much higher priced cars with such operating economy that as an extra car it virtually costs them nothing, due to the reduction in their transportation expenses effected by it.

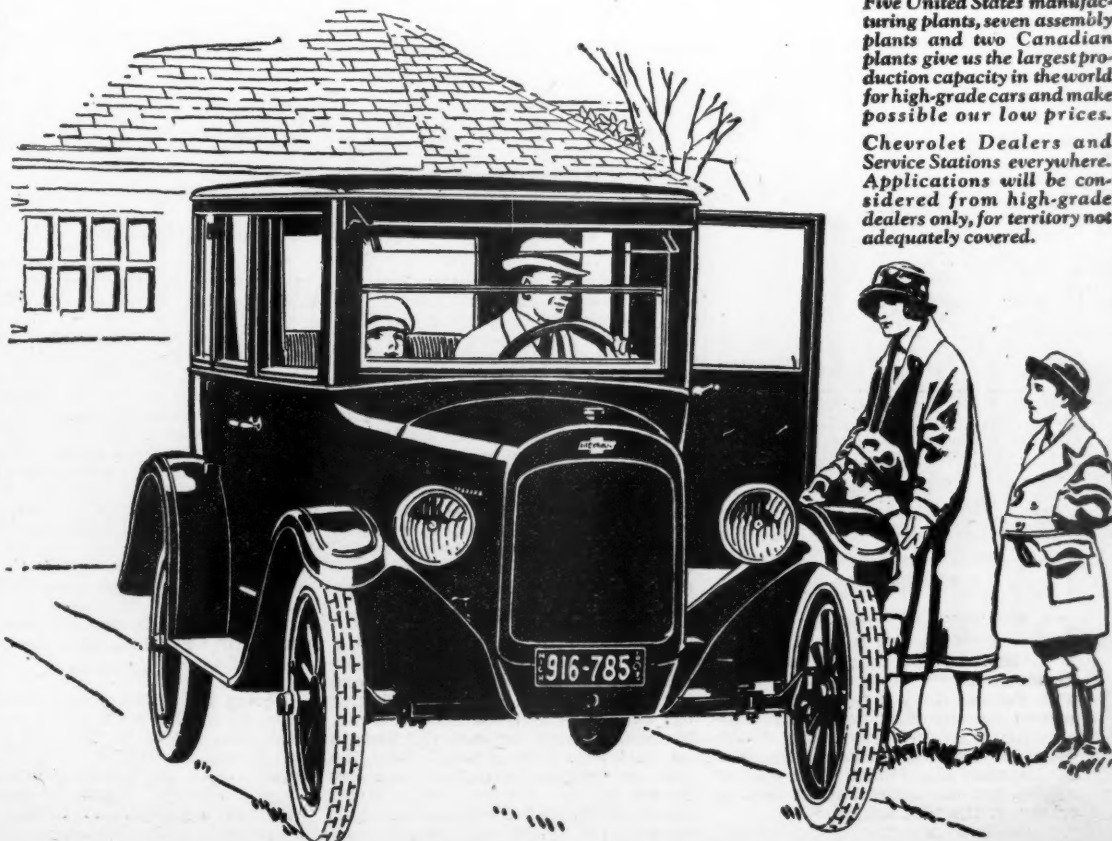
This message, then, is addressed to all in the second and third groups. We respectfully suggest consideration, investigation and comparison of Chevrolet with any other car at any price. The result will be to our mutual benefit.

Chevrolet Motor Company, Detroit, Michigan

Division of General Motors Corporation

Prices f. o. b. Flint, Michigan

Superior Roadster	\$490	Superior Sedan	\$795
Superior Touring	495	Superior Commercial Chassis	395
Superior Utility Coupe	640	Superior Light Delivery	495
Superior 4-Passenger Coupe	725	Utility Express Truck Chassis	550



Five United States manufacturing plants, seven assembly plants and two Canadian plants give us the largest production capacity in the world for high-grade cars and make possible our low prices.

Chevrolet Dealers and Service Stations everywhere. Applications will be considered from high-grade dealers only, for territory not adequately covered.

Dusting Calendar

By W. C. Dutton, Michigan Agricultural College

The Dusting Calendar is given for the benefit of those growers who wish to use the dusting method for all or part of the summer applications. If the spraying method is to be used for part of the applications, it is suggested that such applications be made at the periods for which a choice of dusting and spraying materials is offered, as for the pre-blossom applications on apples and pears.

APPLES

Application.	For.	Materials.
(1) Dormant.	Scale insects.	Any standard material for dormant spraying.
(2) Prepink. Just before blossom buds begin to separate in the clusters.	Apple Scab.	Lime-sulphur solution, 1 1/4-50, superfine sulphur dust or dehydrated copper sulphate dust (15%).
(3) Pink or cluster. Just after buds have separated in the clusters.	Apple Scab and certain chewing insects.	Lime-sulphur solution, 1 1/4-50, plus 1 to 1 1/2 lbs. lead arsenate powder, 90-10 sulphur lead dust or dehydrated copper sulphate dust (15%) with 10% lead arsenate.
(4) Calyx application. Just after petals have dropped.	Apple Scab, codling moth and other chewing insects.	85-15 sulphur-lead dust.
(5) Ten days after (4).	Apple Scab, codling moth and other chewing insects.	85-15 sulphur-lead dust or dehydrated copper sulphate dust (15%) with 15% lead arsenate.
(6) Ten days to 2 weeks after (5).	Same as (5).	90-10 sulphur-lead dust or dehydrated copper sulphate dust with 15% lead arsenate.
(7) Eight to 10 weeks after (4). Each time must be determined locally according to emergence of the second brood of codling moth.	Codling moth and apple scab.	85-15 sulphur-lead dust or copper sulphate dust, with 15% lead arsenate.
(8) Three to 4 weeks after (7).	For codling moth in seasons or in districts where injury by this insect is apt to be severe.	Same as (7).

NOTE.—If aphids or red bugs are present, nicotine sulphate should be used with the spray or dust in the "pink application" and usually again in the dust at the "calyx application."

PEARS

(1) Dormant or	Scale insects.	Lime-sulphur solution, 6 1/4-50 or other standard dormant spray.
(2) Delayed dormant. If pear scab or pear psylla are present. Just before blossom buds begin to separate.	Scale insects, scab, psylla eggs and blister mite.	Lime-sulphur solution, 6 1/4-50. Spray very thoroughly to insure covering all psylla eggs.
(3) Pink or cluster application. Just after blossom buds have separated in the cluster.	Pear scab.	Bordeaux, 3-6-50 formula, superfine sulphur dust or dehydrated copper sulphate dust (15%).
(4) Calyx application. Just after petals have dropped.	Pear scab, codling moth.	90-10 sulphur lead dust or dehydrated copper sulphate dust (15%) with 10% lead arsenate.
(5) Ten days to 2 weeks after (3).	Same as (3).	Same as (3).
(6) Two weeks after (4).	Pear scab.	Sulphur dust or dehydrated copper sulphate dust (15%).
(7) Same time as determined for No. 7 on apples. On varieties very susceptible to scab or in seasons favorable to codling moth development.	Pear scab and codling moth.	90-10 sulphur lead dust or dehydrated copper sulphate dust (15%) with 10% lead arsenate.

NOTE.—If pear psylla are present during the summer, their numbers may be reduced, when in the adult form, by a thorough application of a 2 to 2 1/2% nicotine sulphate dust.

PEACHES

Application.	For.	Materials.
(1) Dormant. Late fall or very early spring.	Leaf curl and scale insects.	Lime-sulphur solution, 6 1/4-50.
(2) Just as the last of "shucks" are falling.	Curculio and Brown Rot.	80-10-10 sulphur-lead-lime dust.
(3) Two weeks after (2).	Curculio and Brown Rot.	Same as (2).
(4) About one month before harvest.	Brown Rot and Peach Scab.	Superfine sulphur dust alone or diluted with 10% of hydrated lime or other inert material.
(5) One week to 10 days before harvest.	Brown Rot and Peach Scab.	Same as (4). This is of particular value on varieties susceptible to Brown Rot in reducing the development of rot both before and after harvest.

NOTE.—This schedule is adapted to districts where curculio is controllable without great difficulty. In the southern districts where curculio is a serious menace, it will probably be desirable to make more frequent applications early in the season and to reduce the proportion of lead arsenate because of possible injury to foliage.

CHERRIES

(1) Dormant. This is not necessary on sour cherries.	Scale insects.	Lime-sulphur solution, 6 1/4-50 or other standard dormant spray.
(2) Just before blossoms open.	Curculio, Leaf Spot and Brown Rot.	Dehydrated copper sulphate dust (20%) with 10% lead arsenate.
(3) Just after petals drop.	Same as (2).	Same as (2).
(4) Ten days to 2 weeks after (3).	Same as (2).	Same as (2).
(5) Two weeks after (4).	Brown Rot and Leaf Spot.	Dehydrated copper sulphate dust (20%)—(without poison).
(6) Soon after fruit is harvested.	Leaf-spot.	Same as (5).

NOTE.—If conditions have been very favorable for brown rot development, application (5) can be profitably repeated about one week before harvest.

PLUMS

(1) Dormant.	Scale Insects.	Lime-sulphur solution, 6 1/4-50, or other standard dormant spray.
(2) Just before blossoms open. This is the least important of all the applications.	Brown Rot and Curculio.	Dehydrated copper sulphate dust (20%) with 10% lead arsenate.
(3) Just after petals have dropped.	Brown Rot, and Curculio and Leaf-spot.	Same as (2).
(4) Two to 3 weeks after (3).	Same as (3).	Same as (2).
(5) About 1 month before harvest.	Brown Rot and Leaf-spot.	Dehydrated copper sulphate dust (20%). If curculio is prevalent at this time the poison should be added.
(6) One week to 10 days before harvest.	Brown Rot.	Sulphur dust or dehydrated copper sulphate dust.

NOTE.—For Japanese varieties of plums, it will be safer to follow the summer schedule recommended for peaches.

GRAPES

(1) When shoots are 6-10 inches long.	Black Rot and Mildew.	Dehydrated copper sulphate dust (20%).
(2) Just before blossoms open.	Black Rot, Mildews, Berry-moth, and other chewing insects.	Dehydrated copper sulphate dust (20%) with 10% lead arsenate.
(3) Just after blooming period.	Same as (2).	Same as (2).
(4) Two weeks after (3).	Same as (2).	Same as (2).
(5) Ten days to 2 weeks, or just before the berries touch in the bunches.	Especially for Berry-moth, also for rot, etc.	Same as (2).

NOTE.—If leaf-hoppers are present, an application of nicotine dust should be made just before the oldest nymphs develop wings. This will probably come about the time of Application No. 4. If the nymphs continue to appear, as they probably will if weather conditions are favorable, the application of nicotine dust should be repeated in about 2 weeks.

Phoma Fruit Spot of Apples

by Charles Brooks

United States Department of Agriculture

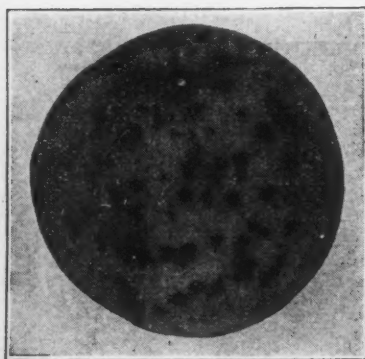


Fig. 1—Phoma fruit spot as seen at picking time.

OUR PRESENT markets demand fruit that has a good appearance as well as good flavor and keeping quality. Some of the spots and defects that would once have passed unnoticed or as variety characteristics are now the cause of considerable concern. Among this class of diseases, the Phoma fruit spot of apples has attracted a great deal of attention the past season.

Unfortunately the disease has acquired several different names. It was first studied in detail at the New Hampshire Experiment Station and the results reported under the title of "Fruit Spot of Apples." With later reports appearing on various other spot diseases of the apple, this name did not prove sufficiently distinctive and has sometimes been qualified as the "New Hampshire fruit spot." The disease has also been given the names "fruit speck" and "Brooks fruit spot." Probably the most satisfactory name is Phoma fruit spot, formed by prefixing the name of the genus to which the causal fungus has been assigned.

History and Distribution.

The origin of the disease is unknown. The first records of its occurrence come from New Jersey, and it is probable that its introduction in the country was made in that state. In 1892, Halsted reported the disease on quince in New Jersey, under the name of "quince blotch," but the first record of the disease comes from carefully painted Phoma fruit spots

on water color drawings of apples made by the daughters of William Coxé of Burlington, N. J. Coxé was the author of, "A View of the Cultivation of Fruit Trees of America," published in 1817, and planned to publish a second edition, to be illustrated with the colored drawings prepared by his daughters. The drawings were probably made about 1810 to 1828, so the disease must have been in the United States for a century. Phoma fruit spot was reported from Connecticut in 1905 and from New Hampshire in 1908 and is now known to be quite generally distributed over the eastern United States from Maine to North Carolina. It occurs in Michigan and in Canada and has been quite serious in Ohio and Arkansas.

Varieties Affected.

Phoma fruit spot occurs on practically all of the commercial varieties of apples, but is particularly serious on Jonathan, Baldwin and Tolman Sweet, and is quite common on Grimes Golden, Rome Beauty and Stayman Winesap. It occurs on a

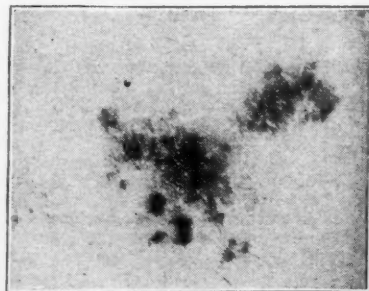


Fig. 2—A single Phoma fruit spot (magnified). The spot is the one indicated by the arrow in Fig. 1.

number of varieties of quince (*Cydonia vulgaris* Pers.) but the Orange quince seems to be particularly susceptible. The disease also occurs on the Chinese quince *Cydonia sinensis* Thoun. The spots on the apple and quince are similar in appearance and caused by the same fungus.

Appearance of the Disease.

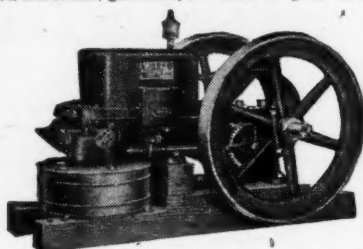
The Phoma fruit spots are small, seldom having a diameter of more than three-sixteenths of an inch. (Continued on page 28.)

Puts 2 H-P Engine on Your Place For Only \$14.24

Ed. H. Witte, Famous Engine Manufacturer, Makes Startling Offer On Witte Throttling-Governor Magneto-Equipped Engine.

Farmers, now more than ever, appreciate the need of power on the farm and know they can make \$500 to \$1,000 additional profit a year with an all-purpose engine.

Ed. H. Witte, nationally-known engine manufacturer, has announced a 2-horse power engine which burns either kerosene, gasoline, distillate or gas with a special throttling governor. It delivers full power on kerosene, gasoline, distillate or gas. This



new WITTE ENGINE has revolutionized power on the farm as it handles practically every job with ease at a fraction of the cost of hired help. Easily moved from one job to another, it is trouble-proof and so simple that a boy can operate it.

To introduce this wonderful new engine to a million new users Mr. Witte has arranged to put it on any place for a 90-day guaranteed test. Since it costs only \$14.24 to take advantage of this sensational offer and nearly a year to pay the low balance, Mr. Witte confidently expects every progressive power-user to be soon using a WITTE. Every reader of this paper who is interested in making bigger profits and doing all jobs by engine power should write today to Mr. E. H. Witte, 2145 Oakland Ave., Kansas City, Mo., or 2145 Empire Bldg., Pittsburgh, Pa., for full details of this remarkable offer. You are under no obligations by writing.

CHERRY TREES

Montmorency Early Richmond

EDWARD J. KNUDSEN

"The Cherry Tree Man"

2234 East 81st St., Nursery :
Cleveland, Ohio. Saybrook, Ohio.



Write for big FREE CATALOG of Distinctive Chicks From Qualified Breeding Flocks. The beautiful book is fully illustrated and filled with helpful "chick facts." Chicks ready now and weekly hereafter. Nine popular breeds; superior quality; moderate prices.

Rosemont Poultry Farms & Hatchery
Drawer 11, Rosemont, Hunterdon Co., New Jersey

SPRAY YOUR FRUIT TREES AND VINES

Reduced Prices Destroy the fungi and worms; be sure of larger yields of perfect fruit. Stahl's Excelsior Spraying Outfit Prepared Mixtures are used in large orchards everywhere; highly endorsed by successful growers for thirty-five years. 20 models, power or hand types. Write for free catalog containing full treatise on spraying fruit and vegetables. WM. STAHL SPRAYER CO., Box 74 Quincy, Ill.

RESULTS COUNT American Fruit Grower Magazine Classified Advertisements

Fisk Cords deliver that dependable mileage that brings your mail on time every day in the year



FISK

CORD TIRES



It Will Pay You

Get our prices before placing your order for Spraying or Dusting Materials.

Lime Sulphur Solution, Arsenate of Lead, and Calso, —the perfect potato, tobacco and truck sprays our specialties.

STANDARD CHEMICAL WORKS
Incorporated
Womelsdorf, Penna.

Largest plant in America devoted exclusively to the manufacture of insecticides and fungicides.

The "TIFFANY" Improved All Steel Double Cut Tree Pruners

LIGHT,
DURABLE
AND
EFFICIENT

CUTS
1 1/2-INCH
LIMBS
WITH
EASE.



BETTER
THAN
EVER, AS
IT CUTS
FROM
BOTH
SIDES OF
THE LIMB
AND DOES
NOT
BRUISE.

Forged from bars of fine crucible steel carefully tempered in oil, and fitted with hardwood hand grips, which cannot come off, split or pinch the fingers. Weight 3 lbs. Length 24 ins. Price \$3.50 postpaid, or sent C. O. D. West of the Mississippi add 25c.

Send for Booklet of Horticultural Tools.
Carroll R. Tiffany, Mfr., Conklin, N. Y.

HOTEL EMPIRE

Broadway at Sixty-Third Street, NEW YORK CITY

A NEW fourteen story fireproof structure containing every modern convenience and "Servidor" Service.

Capacity - 1,034

The location is unique; Subway, elevated, street cars, busses, all at door.

RATES:

Room, private toilet - \$2.50
Single Room with bath - 3.00
Double Room with bath - 4.00



Under Personal Direction P. V. LAND, Manager

Citrus Insects and Diseases in Florida

by W. L. Floyd
University of Florida

THE MILD climate, abundant moisture and luxuriant vegetation make especially favorable conditions for the development of insect and fungous life. Fortunately the balance of nature is maintained here as well, or perhaps better, than elsewhere by one form preying on another. Nowhere else in the United States do the parasitic fungi develop and spread on insects that are troublesome in such number and variety.

The white fly has five known species of fungi thriving on its larvae, at least three of which are quite helpful in holding it in check in citrus groves. These are:

Red Fungus.

This fungus first shows itself as slight opaque, yellowish spots near the edge of the larvae. Delicate filaments grow into the soft tissues of the insects' bodies, absorbing the life juices. As the growth proceeds, these filaments spread over the larvae, completely enveloping them in densely interwoven disc-like cushions. Later there forms near the edges of each cushion small cavities in which bright red masses of spores develop. These yellow cushions with red spore masses set in them present a striking and characteristic appearance, hence the popular name "Red Fungus."

Yellow Fungus.

A fungus bearing yellow spore masses, but in other respects very similar to the red, growing on the cloudy winged white fly larvae. Just as some kinds of peaches or apples do better on clay and others on sandy soils, so here some kinds of fungi do better on one larval soil than another.

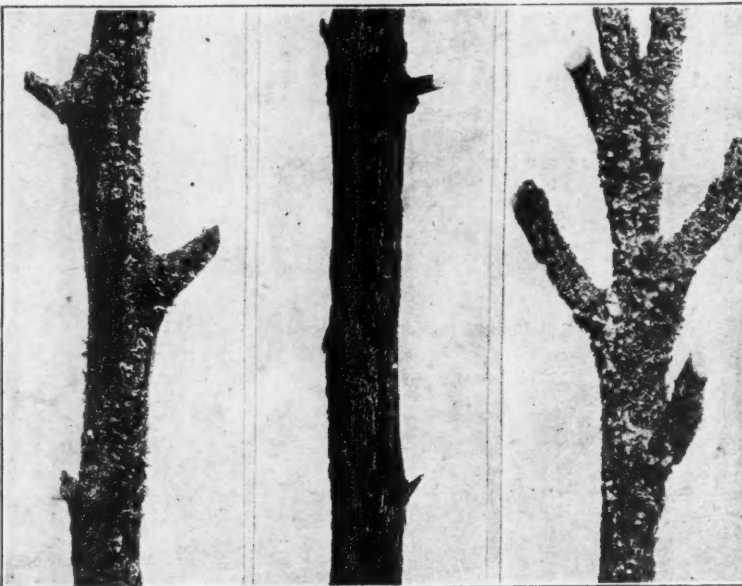
Brown Fungus.

The filaments of this are light brown in color, those entering the bodies of the larvae a much deeper brown; many filaments grow over the larval body, intertwine and finally form a compact seal brown membrane, not so much raised and cushion-like as that of the red and yellow fungus. This is called the "Brown Fungus." From the base of this membrane, colorless filaments reach out in all directions like runners from strawberry plants. When

a new larva is reached it is soon enveloped and destroyed. Some of these filaments are found two or three inches long, often reaching to the upper surface of the leaf.

For some years no fruiting bodies were found on this fungus. It was observed to spread from one part of

Station, noted what appeared to be spores on the filaments on the upper side of the leaves. From these he succeeded in growing the characteristic fungus on white fly larvae. The reason for the long filaments reaching the top of the leaves was thus made plain. Conditions of light and air



Left—Red headed fungus on purple scale. Center—Black fungus on purple scale on grapefruit twig. Right—Gray headed fungus on purple scale attacking a twig.

a grove to another and it was thought probable that this was due to pieces of filaments being broken off and carried by the wind and by birds beginning growth anew, as natural cuttings from willows broken off and falling in the mud sometimes grow, and no doubt it is often spread in this way. In 1908, Prof. H. S. Fawcett, then of the Florida Experiment

were most favorable there for fruiting. Because of being on the opposite side of the leaf and having a different appearance from the brown membranes enveloping the larvae, it took a trained observer to associate the two and find these fruiting bodies.

Other less important fungi attacking white fly are White Fringe and Cinnamon.

Purple and long scale which rank next to white fly as serious citrus pests have three fungous parasites, while the Florida red scale has one, the pink, attacking it.

Red Headed Fungus.

A spore of this fungus floating in a drop of dew or rain is brought to the edge of the scale where it sprouts and sends its thread-like filaments into the soft tissue of the insect. These filaments branch and rebranch till a network is formed, then a bright orange-red knob-like growth breaks through the scale covering or develops at its base. These knobs are fruiting bodies bearing large numbers of spores. Their color and shape give the popular name Red Headed to the fungus.

Gray Headed Fungus.

This is more effective than the red-headed, which it resembles in most respects. The knob bearing the spores is white or gray and the spores are trident shaped. The arms of the tridents close on drying and open on becoming damp. This aids in their dissemination.

Black Fungus.

There is often found attached to the scale insects, especially those attacking twigs and fruit, a heavy black crust. In this spores are embedded. Sometimes the fruit are thought to be injuriously affected when only a pest is being destroyed.

Pink Fungus.

This attacks Florida Red Scale mainly, but sometimes also the Purple and Long. Its habits and method of spreading are much like the others. Japanese entomologists found and described it in Formosa about the time it was found here.

Mealy bugs, which are a serious pest in some other states, seldom increase in large numbers here because of the fungus *Entomophthora formosa*, recently found to be present on them in almost all localities.

Spreading in Groves.

Various methods of spreading these helpful fungi in infested groves have (Continued on page 35.)

Spray Schedule for New England

By Fred Sears, Massachusetts Agricultural College

APPLE				PEACH			
Time of Application.	Materials Used.	Enemy.	Remarks.	Time of Application.	Materials Used.	Enemy.	Remarks.
(1) Delayed Dormant. Early spring as buds are breaking.	Lime-sulphur 6 gal. in 50. 40% nicotine sulphate ½ pt.	Aphis, San Jose Scale, Blister mite.	This spray has very largely superseded the dormant application.	(1) Dormant Spray applied either late autumn or early spring before buds begin to swell.	Lime-sulphur 6 gal. in 50.	San Jose Scale and Leaf Curl.	Autumn application is increasing.
(2) Pre-Pink. Before the clusters of blossom buds separate.	Lime-sulphur 1 gal. in 50.	Apple Scab.	Used on McIntosh and other varieties especially subject to scab. Very effective.	(2) First summer spray just as the calyxes begin to fall from the small fruits.	Self-bolled lime-sulphur or atomic sulphur; 3 lbs. arsenate of lead paste or 1½ lbs. powder.	Curculio, Brown Rot, Scab.	If Aphis is present add ½ pt. nicotine sulphate per 50 gal.
(3) Blossom-Pink. As blossom buds begin to show pink.	Lime-sulphur 1 gal. in 50. Arsenate of lead paste 3 lbs. Powder 1½ lbs. Nicotine sulphate ½ pint.	Red Bug, Scab, Curculio, Aphis, Tent Caterpillar, Bud Moth, Brown Tail Moth, Gypsy Moth, Canker Worm.	In areas where the gypsy moth is troublesome the amount of arsenate of lead is doubled.	(3) Second summer spray applied 2 or 3 weeks after No. 2.	Same as No. 2.	Same as No. 2.	
(4) Calyx. When last of petals are falling.	Same as (3).	Codling Moth, Scab, Curculio, Red Bug, Aphis, Gypsy Moth, Sooty fungus.	Generally regarded as the most important single spray.	(4) Third summer spray applied 2 or 3 weeks after No. 3.	Self-bolled lime-sulphur or atomic sulphur.	Brown Rot and Scab.	May be omitted on early ripening varieties.
(5) 3 or 4 weeks after calyx spray.	Same as calyx spray except no nicotine sulphate.	Same as calyx except Red Bug and Aphis.					
NOTES.				PEAR			
1. Special Sprays.—The following special sprays are sometimes applied in addition to those listed above:				(1) Cluster Bud, as blossom buds separate in clusters.	Lime-sulphur 6 gal. in 50. Nicotine sulphate ½ pt.	Scale, Scab, Blister Mite, Psylla (eggs and hibernating adults).	
1. Where plum curculio is serious on apples a spray of arsenate of lead, usual strength, is applied a week or ten days after the calyx spray.				(2) Calyx. Just after petals fall.	Lime-sulphur 1 gal. in 50 gal. Arsenate of lead 3 lbs. paste or 1½ lbs. powder. Nicotine sulphate ½ pt.	Codling Moth, Curculio, Scab.	Most important single spray.
2. In seasons or localities where sooty fungus is expected to be serious a spray of lime-sulphur, 1 gal. to 50, is made about two months after the calyx spray.				(3) 4 or 5 weeks after calyx spray.	Same materials as calyx spray except nicotine sulphate.	Codling Moth, Scab, other fungous diseases and leafing insects.	
2. Bordeaux mixture is being used somewhat for the pre-pink and pink sprays on the theory that it is more effective than lime-sulphur. It does not appear to russet the fruit appreciably if used at these times.				NOTE.—Some growers are using an oil spray or winter strength lime-sulphur as a delayed dormant spray.			
3. Dry lime-sulphur has not been used extensively by New England orchardists. It costs more per gallon of spray and some brands do not thoroughly dissolve, which leaves a residue that wears out nozzles.							
4. Dusting was quite commonly used, instead of spraying, in parts of Maine in 1921, but has not been used to any extent in other parts of New England.							

"A Stark OLD OAK PROCESS Tree Would Actually be CHEAP at \$5!"

(SOLD ONLY BY STARK BROS)

"—compared to so-called 'cheap' trees as a gift! Last Spring I bought 800 trees (NOT Stark Trees—see Photo marked 2 for one of them)—because of a so-called 'bargain price.' I had to throw away 400 of the 800 because they were worthless.

"I received from Stark Bro's a lot of OLD OAK PROCESS Whole-Root Stark Trees (the ORIGINAL TREE Strain) of Red Stark Delicious at the same

time. So I planted the best of the cheap trees between the Stark trees.

"Now—just look at the difference! Top photo marked 1 is a Stark Delicious only 1 yr. 3 mos. planted. Photo 2 is a 'cheap' tree planted at same time as 1. Photo 3 is another Stark Tree only 3 mos. planted—much bigger today than the 'cheap' tree planted a whole year before! That's why I say that a Stark OLD OAK PROCESS Whole Root Tree would actually be cheap at \$5.00 each—compared to those so-called 'cheap' trees if I got them as a gift!"

—Says Mr. Sutton of Houser & Sutton Big Orchardists near Newton, ILL.



Photo No. 1 (above) shows remarkable growth of OLD OAK PROCESS Whole Root Stark Delicious Tree only 1 yr. and 3 months after planting.

Stark Delicious

—the genuine ORIGINAL TREE Strain (obtainable from Stark Bro's ONLY) are all OLD OAK PROCESS Whole Root Trees. They cannot be offered at "Bargain Prices," but are always—

Sold at Reasonable Prices

—and develop into big, husky, fast-growing, young bearing trees for home, farm or commercial orchard. "There is a Reason!" The roots are the "feeders" of a tree. If they are strong and vigorous (like the big roots shown in photo below) the trees will quickly extend the root systems downward and in all directions—take firm grip on the soil—eagerly suck up strength from the earth—shoot upward like a husky, healthy outdoors boy—come into bearing young and live and bear big crops long years after cheap, weak, piece-root trees have been cut up for kindling.

Learn WHY and HOW this is TRUE—Send your Name and address on Coupon—or Postcard—for FREE Copy of NEW 1924 Stark Fruit Tree Book—80 Pages, 316 Illustrations of every Fine Quality Variety of Apple, Peach, Pear, Plum, Cherry, Berry, etc., in beautiful 4-color pictures.

Get 5 Seeds of Stark's "BLIGHT-RESISTER" Tomato **FREE!**

This is the amazing Blight and Wilt Resistant Tomato (Imp. NORTON) of which 650 plants yielded ERNST HERRMAN, Harvard, MASS., 105 bu. that sold wholesale for \$2.00 to \$3.00 per bushel. Send COUPON—and get 5 FREE SEEDS and FREE Copy 1924 Stark Vegetable, Flower and Farm Seed BOOK.



Photo No. 2 (above) shows a "cheap" bargain-price "piece-root" tree 1 year and 3 months after planting. Note puny, weakling growth.

Photo No. 3 (above) shows a Stark OLD OAK PROCESS Whole Root Tree only 3 months after planting. Even this 3-months tree is much bigger than 15 mos. cheap tree.

Learn the Inner Secrets of Stark Tree Superiority!

Get This Big Book FREE!

This book tells YOU what 108 years of Nursery and Orchard experience has taught us. It takes you into our confidence and gives YOU the WHY and the HOW of the remarkable money-crop and quality-fruit results that Stark OLD OAK PROCESS Whole Root Trees bring to owners of backyard orchards, farm orchards and commercial orchards.

Send your Name and Address on the Coupon—or a Post Card—for YOUR FREE COPY—TODAY!

Address Box 289

STARK BRO'S NURSERIES

Oldest in America—Largest in World

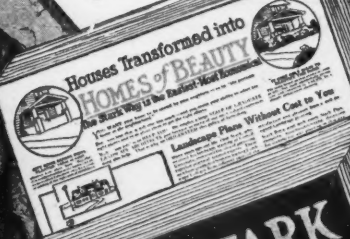
At LOUISIANA, MO.

For Over 108 Years

These 3 Worth While Books

FREE

With Your Name and Address



STARK SEEDS

5 SEEDS FREE

STARK'S "Blight-Resister" Tomato—the most sensational Tomato ever introduced—resists wilt and blight—send Coupon for 5 seeds—**FREE**

The Remarkable Roots of Stark Bro's PATENTED Trade Mark Whole Root Trees

Send at once FREE copies of NEW 1924 Books marked with X in squares below:

☐ BIG NEW 80-page 4-color 1924 De Luxe Edition of STARK FRUIT TREE BOOK—THE SPECIAL EDITION "HOMES OF BEAUTY" Trees, Shrubs, Insects, Diseases and How to Handle Them. Put in squares at left if you want a FREE SEED BOOK.

☐ I may plant (State Kind and Number)

Name _____

St or R.R. No. _____

P.O. _____

State _____

Am. P. O. 2-24

Am. P. O. 2-24

Am. P. O. 2-24

Spray Calendars for Virginia

By G. S. Ralston, Virginia Polytechnic Institute

SPRAY CALENDAR FOR THE APPLE

Number and Name of Spray.	District.	Parasites.	Time of Application.	Materials to Use.	Remarks.
1. Delayed Dormant.	All districts.	Scale and aphid.	When green can first be seen in tips of blossom buds.	Standard strength lime-sulphur (see note No. 1) diluted 1 to 8 or its equivalent of other strength solutions. Add $\frac{1}{2}$ pt. Nicotine Sulphate to each 100 gal. of solution. If scale is found in any considerable amount, substitute Scalecide or the government lubricating oil emulsion for the lime-sulphur solution.	Every orchard should receive this spray. If scale infestation is severe, spray immediately with one of the oil sprays and then apply spray No. 1 at recommended time, using lime-sulphur and nicotine.
2. Pink Spray.	All districts.	Scab and mildew.	Begin when pink shows plainly in blossom buds.	Lime-sulphur, 5 qt. standard strength to 50 gal. of water.	Spray all varieties except York and Grimes, and if these varieties were infected at all in preceding year, give them this spray treatment.
3. Calyx Spray.	All districts.	Codling moth, leaf roller, curculio, tent caterpillar, scab, mildew.	When petals are seven-eighths fallen.	Standard strength lime-sulphur, 5 qt. to 50 gal. water. To each 50 gal. of the solution add $\frac{1}{2}$ lbs. powdered lead arsenate.	This spray is very important as a means of controlling codling moth and scab. The amount of lead arsenate has been increased to give better control of leaf roller.
4. Ten-Day Spray.	All districts.	Frog eye leaf spot, scab, mildew, blotch.	Ten days after the "Calyx Spray."	Same as in spray No. 2. If blotch has been prevalent substitute Bordeaux mixture 4-5-50 formula for the lime-sulphur.	The most effective frog eye leaf spot spray and very important for scab control. If the former disease is not prevalent, this spray might be omitted on York and Grimes, but it should be applied on scab susceptible varieties.
5. Four-Week Spray.	All districts.	Leaf roller, codling moth, scab, bitter and black rots, blotch, cloud.	Apply four weeks after the "Calyx Spray." It is important that this spray be completed on the Pippins by June 5. Spray the Pippins first, then other varieties.	Bordeaux mixture 4-5-50 formula in district No. 1 and in Pippin or other rot susceptible orchards in all districts. Use Bordeaux 3-5-50 formula generally in districts 2 and 3. Add $\frac{1}{2}$ lbs. powdered lead arsenate to each 50 gal. of the mixture.	This spray is applied at the time the first brood codling moth larvae are hatching. Without this spray, neither codling moth nor bitter rot, in infected orchards, can be controlled. Bordeaux rather than lime-sulphur should be used since it is more effective and less dangerous to use.
6. Seven-Week Spray.	No. 1 and in rot susceptible orchards in 2 and 3.	Bitter and black rots, cloud, blotch.	Seven weeks after the "Calyx Spray."	Bordeaux mixture 4-5-50 formula.	Apply in Pippin and other rot susceptible orchards; also wherever rot, cloud or blotch was prevalent the preceding season.
7. Ten-Week Spray.	All districts.	Codling moth, leaf roller, bitter and black rots, cloud.	Ten weeks after the "Calyx Spray" and 3 weeks after the "Seven Weeks Spray."	Bordeaux mixture 3-5-50 formula, except in Pippin or other rot susceptible orchards where the 4-5-50 formula Bordeaux should be used. Add $\frac{1}{2}$ lbs. powdered lead arsenate to each 50 gal. of mixture.	This spray is recommended just before the period when the codling moth larvae of the second brood hatch in greatest numbers. It is also necessary for leaf roller control.
8. The August Spray.	All districts.	Leaf roller and codling moth.	Probably Aug. 15 to 30. Exact date will be given through the Spray Service organization.	Lead arsenate, 6 lbs. powdered form to each 100 gal. of water. Add 20 lbs. lime to each 100 gal. of the mixture.	It is quite possible that this spray may not be necessary. The need will be determined by the field entomologists and the information will be sent out through the Spray Service channels to the growers.

Note No. 1—Standard strength lime-sulphur tests 32 degrees Baume.

District No. 1 includes Fairfax, Culpeper, Madison, Orange, Green, Albemarle, Nelson, Amherst, Bedford, Roanoke, Botetourt, Franklin, Patrick, Carroll and counties to the east. Recommendations for this district are applicable to the mountain districts of North Carolina.

District No. 2 includes the "Valley of Virginia," Loudoun, Fauquier, Rappahannock, Smyth, Pulaski, Washington counties and points below 1800 feet elevation in the Appalachian mountains. Recommendations for this district are applicable to adjoining districts in western Maryland and West Virginia.

District No. 3 includes Alleghany, Wythe and Montgomery counties and Appalachian points above 1800 feet elevation.

Spray Service—Information as to actual time of application of sprays Nos. 5, 7 and 8 will be sent to the growers through the Spray Service channels. This information will be secured by field entomologists and will be disseminated through the office of the county agents or through the office of local fruit growers' organizations. In addition, attention will be called to the other sprays prior to time of application through the same channels.

Testing lime-sulphur—It is suggested that strength of lime-sulphur be tested both in the concentrate and dilute form. This will guard against mistake and may prevent loss from inefficient strength or from burning.

SPRAY CALENDAR FOR PEACH

No. and Time of Application.	Materials to Use.	Parasites.
1. Dormant season (before buds have commenced to swell).	Standard strength lime-sulphur, diluted 1 to 8.	Scale. Leaf curl.
2. Immediately after the petals drop.	One pound powdered lead arsenate to 50 gal. water; add 3 lb. freshly slaked lime to each 50 gal. of solution.	Curculio.
3. One week after No. 2.	Self-boiled lime and sulphur; add 1 lb. powdered lead arsenate to each 50 gal. of solution.	Curculio. Scab. Brown rot.
4. Three weeks after No. 3.	Same as in No. 3.	Same as in No. 3.
5. One month before fruit ripens.	Self-boiled lime and sulphur.	Scab. Brown rot.
6. For late varieties only: three weeks after No. 5.	Same as in No. 5.	Brown rot.

The reader may note that spray schedule is arranged slightly different from that in last year's calendar. This is due to the need of earlier treatment for curculio, due to increased prevalence of wormy fruit.

If the peach orchard has suffered from early infection of brown rot, resulting in blighting of the blossoms and drying up and dropping of the small fruit, apply same treatment as in spray No. 3 when pink shows in the bud, and give similar treatment in spray No. 2 in place of treatment scheduled in above calendar. Generally speaking early infection of brown rot is not prevalent in Virginia and if found at all it probably will be in the eastern part of the state. Unless it is known to prevail, treat peach orchard as set down in tabulated schedule.

SPRAY CALENDAR FOR CHERRY

No. and Time of Application.	Materials to Use.	Parasites.
1. Dormant season.	Lime-sulphur, standard strength, diluted 1 to 8.	Scale and general clean-up.
2. Immediately after petals fall.	Standard strength lime-sulphur; Sour Cherry, diluted 6 qt. to 50 gal. Sweet Cherry, diluted 5 qt. to 50 gal. Add 1 lb. powdered lead arsenate to each 50 gal. of solution.	Leaf spot. Curculio.
3. One week after No. 2.	Same as in No. 2.	Leaf spot. Curculio.
4. Three weeks after No. 3.	Same as in No. 2.	Leaf spot. Curculio. Brown rot.
5. Immediately after fruit is harvested.	Same as in No. 2, but omit the lead arsenate.	Leaf spot.

The general prevalence of cherry leaf spot has made it advisable to give special calendar for the cherry, since the schedule recommended for peaches does not control the cherry leaf spot effectively.

SPRAY CALENDAR FOR PLUM

No. and Time of Application.	Materials to Use.	Parasites.
1. Dormant season.	Standard strength lime-sulphur, diluted 1 to 8.	Scale and general clean-up.
2. As soon as petals fall.	Standard strength lime-sulphur, 6 qt. to 50 gal. water; add 1 lb. powdered lead arsenate to each 50 gal. solution.	Curculio. Leaf spot.
3. One week after No. 2.	Same as in No. 2.	Curculio. Leaf spot.

SPRAY CALENDAR FOR PLUM—Continued

No. and Time of Application.	Materials to Use.	Parasites.
4. Three weeks after No. 3.	Same as in No. 2.	Curculio. Leaf spot.
5. One month before fruit ripens.	Self-boiled lime and sulphur.	Brown rot and other fungous diseases.

SPRAY CALENDAR FOR RASPBERRY AND BLACKBERRY

No. and Time of Application.	Materials to Use.	Pest.
1. In spring before growth starts.	$2\frac{1}{2}$ gal. standard lime-sulphur in 50 gal. water.	Anthraxnose.
2. When new shoots are 6 to 8 in. high.	5 qt. standard lime-sulphur in 50 gal. water.	Same.
3. Just before bloom opens.	Same as No. 2.	Same.

Remove badly diseased canes after fruiting season and burn.

SPRAY CALENDAR FOR GRAPE

No. and Time of Application.	Materials to Use.	Pest.
1. Dormant season.	Lime-sulphur, 32 degrees strength, diluted 1 to 8.	Scale and general clean-up.
2. When second or third leaf shows.	Bordeaux 4-5-50.	Anthraxnose. Bitter rot. Black rot. Mildew.
3. Before blossoms open.	Same.	Same.
4. After blossoms fall.	Same.	Same.
5. Ten to 14 days later.	Same.	Same.

Lead arsenate, 2 lb. powder to each 50 gal. of solution, should be combined with Bordeaux if chewing insects make an appearance.

Burgundy mixture may be substituted for Bordeaux in the last spray in order to prevent discoloring of the fruit. The following formula is suggested:

Caustic soda..... 5 lb.
Copper sulphate..... 4 lb.
Water..... 50 gal.

Prepare and apply same as Bordeaux.

SPRAY CALENDAR FOR STRAWBERRY

No. and Time of Application.	Materials to Use.	Pest.
1. When growth begins.	Bordeaux mixture, 4-5-50 formula.	Leaf spot.
2. Before blossoming.	Same.	Same.
3. Just after blossoming.	Same.	Same.
4. After leaves have been mowed and burned.	Bordeaux mixture plus 1 lb. lead arsenate to each 50 gal. Bordeaux.	Leaf spot. Flea beetle.

Should leaf roller appear, or if it has been prevalent, add lead arsenate at rate recommended in No. 4 spray in each application.

Spraying the Georgia Peach Crop

(Continued from page 4.)

omitted on these earlier varieties. The fourth and last spray is applied four weeks before each variety is due to ripen. The time for this spray, therefore, depends on the ripening period.

It is not applied at the same time to all varieties as is the case with the other three sprays. Both arsenate of lead, four pounds, and self-boiled lime-sulphur (8-8-50) are used in this spray.

Some Use a Late Dust Application.

In order to increase the carrying quality and perhaps make the fruit

more resistant to brown rot infections, a few growers use a dust application of 80 per cent sulphur and 20 per cent lime seven to ten days before the fruit is ready to move (Fig. 3). A liquid spray could not be used so close to the ripening period on account of splashing the fruit; therefore, where this late treatment is desired a dusting

machine is kept on hand for the purpose. The expediency of this practice is doubtful unless considerable rainfall preceded the ripening period.

Brown Rot Usually Follows Curculio.

Brown rot is in many cases a secondary pest of the peach fruit in Georgia. The curculio paves the way for

(Continued on page 20.)

Fordson

A new year dawns on the farm with the coming of spring work.

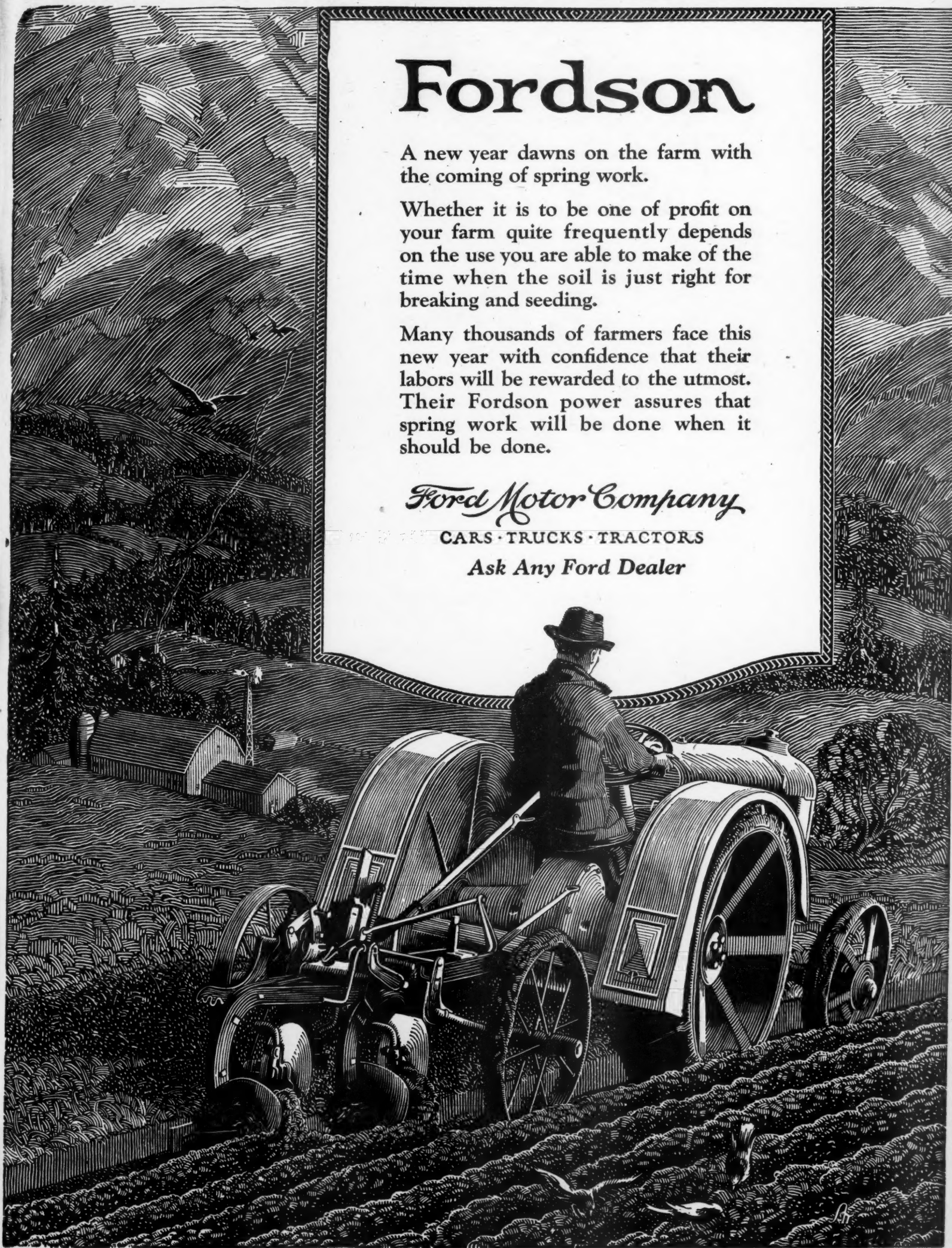
Whether it is to be one of profit on your farm quite frequently depends on the use you are able to make of the time when the soil is just right for breaking and seeding.

Many thousands of farmers face this new year with confidence that their labors will be rewarded to the utmost. Their Fordson power assures that spring work will be done when it should be done.

Ford Motor Company

CARS · TRUCKS · TRACTORS

Ask Any Ford Dealer



Air-cooled power to do the Unusual!

The Air-Cooled, Multi-Purpose "New-Way" 5 Engines in 1

The illustration shows a large, detailed view of the New-Way engine at the top. Below it, a series of smaller scenes depict the engine's versatility: a tractor pulling a plow, a tractor pulling a harrow, a tractor pulling a roller, a tractor pulling a sprayer, and a tractor pulling a duster. The engine is shown in various configurations, demonstrating its adaptability for different agricultural tasks.

Greatest Engine for All Work

The Chert Mountain Orchards, Rada, W. Va., May 25, 1923.
The New Way Motor Co., Lansing, Mich.

Gentlemen—We acknowledge with thanks receipt of booklet on New Way Engines. We have been using New Ways alongside other engines on our Dusters and Sprayers and assure you it is a real satisfaction to take a New Way-equipped rig out on our job.

Our work is all on steep mountain sides, quite a bit of which runs from 30 per cent to 40 per cent grades full of rocks and stumps. These are the conditions ours have to work under not for an hour but day after day throughout our spraying season, with any number of 12 and 14 hour days at that.

Workmanship and material coupled with a design that bespeaks the alertness and effort of your engineers in producing the greatest engine for our work we have ever seen, is our verdict. A properly shaped oil tight crank case, gravity feed fuel supply through an honest-to-goodness carburetor and except for a perfectly smooth fly-wheel there is not an unprotected moving part.

Yours very truly,
The Chert Mountain Orchards,
E. E. Leatherman, Manager.

Here's What Your Own People Say

In orchard and field cultivation, the Air-cooled "New-Way" engine is supreme. It is standard power on the best sprayers and dusters, the best potato diggers, and the best small tractor on the market today. A "New-Way" Air-Cooled engine on your outfit will do your work the way you want it done.

Write for circular E for full specifications.

THE "NEW-WAY" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.

Eastern and Export Office: Woolworth Building, New York

Last Word In Engines

Leeds Manor Orchards,
Markham, Va., 6/21/23.

New Way Motor Company,
Lansing, Michigan.

Gentlemen—I have been foreman at the above for the past nine years and have had to do with quite some number of engines having about 1200 acres of orchard. Some time in 1917 we bought one of your engines which was not only used for spraying but for everything about the place.

This season we bought two of your 5 H. P. "New-Way" Air-Cooled Engines which I consider the last word in engines, being far superior to anything I ever used in rough ground and on hill sides.

Too much emphasis cannot be placed on the rough conditions under which these two engines worked on Hardie and other sprayers and at no time did they give one particle of trouble.

Yours truly,
John A. Sutphin, Foreman.

Spraying the Georgia Peach Crop

(Continued from page 18.)

brown rot infections by rupturing the skin for feeding, or egg laying, purposes. The disease readily enters the fruit through these punctures and sets up an infection. A heavy curculio infestation, therefore, facilitates the establishment of brown rot infection. Whenever the curculio is satisfactorily controlled in Georgia, there is little or no trouble from brown rot. The two applications of self-boiled lime-sulphur (Fig. 4) applied in the third and fourth sprays handle both brown rot and scab in a very satisfactory manner. However, if the curculio were not efficiently controlled the two fungicidal applications would often be insufficient for the control of brown rot.

Peaches Need No Spray During Stone Hardening Period.

Field observation and laboratory studies show conclusively that there is very little, if any, curculio activity during the stone hardening period of the peach. Egg deposition by the curculio ceases when the pit of the fruit begins to harden and does not start again until the fruit enters the ripening and swelling stage. There is also very little feeding on the fruit by the curculio while the pit is hardening. Applications of arsenate of lead during this period are of little value. Therefore, it will not pay to spray peaches from three or four weeks after the calyxes or "shucks" have fallen until a month before the fruit ripens.

The ripening and swelling stage begins about one month before the fruit is ready to be harvested, and it is at this time that the curculio activity starts again in full force. It is during this period that the second curculio brood is so active in Hileys, Georgia Belles, and Elbertas in Georgia. By applying the fourth spray, consisting of arsenate of lead and self-boiled lime-sulphur, four weeks before each variety is due to ripen, the curculio activity during the ripening and swelling period of the fruit is halted.

Dusting vs. Spraying.

Some Georgia growers still use dust during the entire season and report good results from it. Many who were once supporters of the dusting method have forsaken it during the last three years for the liquid again on account of unsatisfactory results. Experiments in testing the two methods of peach pest control in Georgia show that the results from spraying and dusting are about the same when the curculio infestation and brown rot infection are not heavy; however, when these pests are particularly abundant, a better control is procured with the liquid spray. Those who dust in Georgia throughout the season usually use the 80 per cent sulphur, 5 per cent arsenate of lead and 15 per cent hydrated lime formula for all applications.

(Concluded on page 22.)

A Better Summer Spray

Sulfocide Does Not Russet or Drop the Fruit

SCIENTIFIC investigations show the finer the sulphur the greater the fungicidal action. Sulfocide, when sprayed, decomposes to an almost invisible film of true colloidal sulphur. Used on fruits and vegetables. Every one remarks on what high color and finish it produces. H. B. Fullerton, Director L. I. R. R. Exp. Sta., says: "We have absolutely wiped out peach leaf curl, we don't know

yellow, and we have staved off rot." E. R. Longenecker, Magnolia, Del., says: "We got 25c per basket above market price because of the wonderful color and absence of brown rot." Timmerman Bros., Fort Plain, N. Y., say: "We could not grow cucumbers without it, and find it great on all garden plants—a little goes so far." Send for free booklet, "A Better Summer Spray"—it helps growers.

B. G. PRATT CO.
DEPT. 11

SULFOCID
A Better Summer Spray

50 CHURCH ST.
NEW YORK

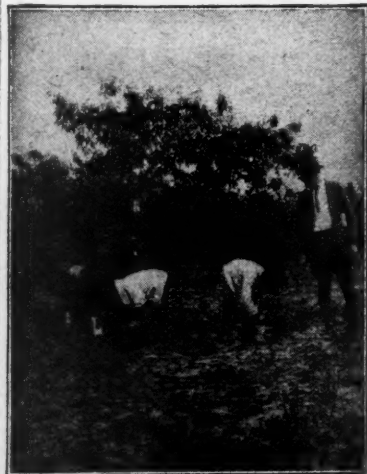


Fig. 5—Picking up peach "drops" in a Georgia commercial peach orchard for control of curculio.

Montgomery Ward & Co.

Established 1872

The Oldest Mail Order House is Today the Most Progressive



Once more the opportunity is yours to save money on reliable goods of standard quality.



This new Spring and Summer Catalogue is yours FREE

This book is yours Free. This new, complete catalogue—offering almost everything you need—is yours merely for the asking.

And what an opportunity this is for you! It brings 50 great stores—a whole city shopping center—right to your door. It offers you an opportunity to save money on every purchase. An opportunity to know before you buy, the lowest price, the right price to pay. An opportunity to buy from a house whose first rule is that you must be pleased with every bargain or you get your money back.

A Real Cash Saving this Season for You

Fifty-one years' experience in buying and manufacturing, in choosing worthy, serviceable merchandise has gone into this book—to insure the biggest possible saving and the greatest possible satisfaction for you and your family.

Fifty million dollars' worth of merchandise bought when costs were lowest, bought for cash, and manufactured just for this Catalogue. This is the enormous cash buying power, backed by long experience, that makes possible these savings for you.

In the East, in the West, in the South, and in Europe, our organization of over 100 buyers search with ready cash for low prices—for bargains. But we never buy merely cheap goods. We never lose sight of your satisfaction with what you buy.

Ward Quality Means Reliable Goods Always

You will get from Ward's only goods that will stand inspection and use. We never sacrifice quality to make a low price. We offer only the kind of goods that is best for you to buy—the kind that will hold your patronage.

For fifty-one years—Quality has come first at Ward's. And to you who have never bought by mail, we say that we do not believe any business house exercises greater care in expertly testing and proving its merchandise than Montgomery Ward & Co.

Everything for the Home, the Farm and the Family

FOR WOMEN: In New York our own Fashion Experts see every new Fashion creation. And we have selected for you the best and most beautiful of New York Styles. To every woman, the young woman and the girl, we offer the opportunity to be dressed in good style and good taste—without paying the usual "Fashion Profits." The Woman's Section of this Catalogue will be a delight to you.

FOR THE HOME: Beauty and Comfort and Usefulness—each article we sell for home decoration and house furnishing has these merits. Everything is selected by experts. To the woman interested in beautifying and modernizing her home, this Catalogue offers a treat indeed. Everything practical, everything new, and everything at a saving that makes possible the purchase of more new things than you had planned.

FOR THE FARM: For fifty-one years we have been friends of the American Farmer. And he has been our friend. We are continuing our help by working harder than ever before to make his savings greater and to make his money go further. Everything must be to his complete satisfaction. This Catalogue offers almost everything for the farm—from poultry and stock supplies to fencing, hardware, and tillage tools.

FOR MEN: Overcoats, suits, shoes—everything for man's, young man's and boy's wear in good style and of serviceable quality. Tires, auto accessories, batteries, everything for the automobile. This book shows, in fact, almost everything a man wears or uses or that is of interest to a man, and the prices offer a saving—always.

Send for the Catalogue

We will send you the Catalogue free. Write for the book—this coupon or a post card will do. Study this Catalogue leisurely in your own home. Learn for yourself the advantage of buying by mail—of buying under our ironclad guarantee that has stood for fifty-one years: "Satisfaction guaranteed or your money back."

Write for this Catalogue. See for yourself the saving, the convenience, the satisfaction that Montgomery Ward & Co. offer you.

MONTGOMERY WARD & CO.

Chicago Kansas City St. Paul
Portland, Ore. Ft. Worth Oakland, Cal.

24 Hour Service

Most orders shipped within 24 hours. Nearly all orders shipped in less than 48 hours.

We have perfected our service for you. After much study and testing new systems and employing experts we have perfected a system that makes certain your orders will be shipped promptly.

Our records prove that during the past year most of our orders were shipped in 24 hours—nearly all of our orders within 48 hours.

Lower prices, better merchandise, and now 24 hour service. True it is indeed that: Montgomery Ward & Co., the Oldest Mail Order House is Today the Most Progressive.

Fill in and mail coupon NOW!



This Coupon brings this new Catalogue Free

To MONTGOMERY WARD & CO.
Dept. 73-H

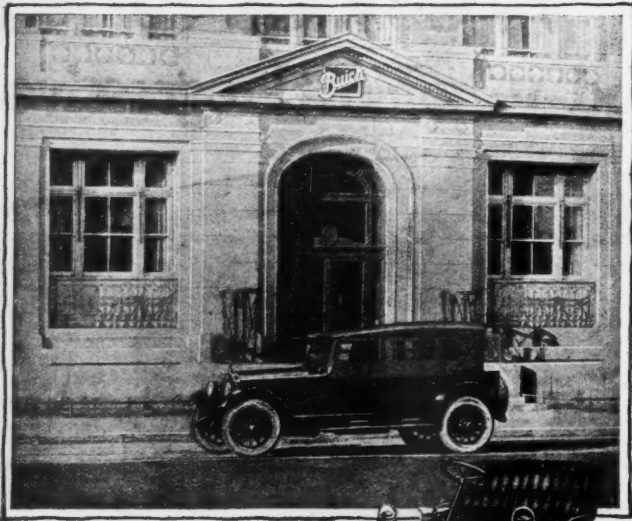
Chicago, Kansas City, St. Paul, Portland, Ore.,
Ft. Worth, Oakland, Cal.

(Mail this coupon to the house nearest you)
Please mail me my free copy of Montgomery Ward's complete Spring and Summer Catalogue.

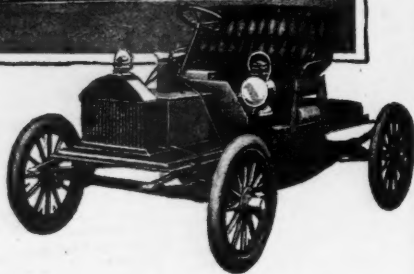
Name

Address

FACTS ABOUT A FAMOUS FAMILY



The first Buick and the millionth Buick. In each of the other members of the General Motors family there has been the same impressive progress.



117 Years of Experience

No AMERICAN automobile company is more than thirty years old. But the combined manufacturing experience of the members of the General Motors family totals 117 years—Buick 20 years, Cadillac 22 years, Oldsmobile 27 years, Oakland 17 years, Chevrolet 11 years, GMC Trucks 20 years.

Many more years of specialized experience are contributed by the manufacturers of automotive parts, accessories and equipment within the General Motors family.

Thus, when you buy a General Motors car, you profit by all the experience of the member which makes it, *plus* the accumulated knowledge of the family of which that member is a part.

GENERAL MOTORS

BUICK • CADILLAC • CHEVROLET • OLDSMOBILE
OAKLAND • GMC TRUCKS

General Motors cars and Delco-Light products may be purchased on the GMAC Deferred Payment Plan. Insurance service is furnished by General Exchange Corporation.

Spraying the Georgia Peach Crop

(Continued on page 20.)

tions. These applications are made as follows: First, immediately after the petals have fallen; second, when the calyces or "shucks" are shedding; third, two weeks after the second application; and fourth, four weeks before each variety is due to ripen. A few use a fifth application of dust, consisting of 80 per cent sulphur and 10 per cent hydrated lime, applied seven to ten days before harvest.

Supplementary Control Measures.

There are other control measures which most of the Georgia peach growers enforce in addition to the spraying program. The value of picking up peach "drops" was clearly demonstrated in 1921, when this practice so materially aided in correcting Georgia's abnormal curculio conditions. Now fully 95 per cent of the commercial peach growers in the state regularly pick up the peach "drops" each season (Fig. 5). They are sold to the practice and some say they would rather do without spraying than to have to suspend the practice of picking up "drops."

Most of the peaches that are "stung" by a curculio early in the season fall to the ground before and during the April drop. These infested drops furnish the adults, from whence come the destructive second brood of "worms." The frequent picking up and destruction of these drops prevents the maturity of thousands of adult beetles, and in this way the second curculio "crop" is materially reduced.

Disking under the spread of the trees during the pupation season of the curculio is another supplementary control measure that is often enforced in Georgia. It has been found that by breaking the soil cell while the curculio is in the helpless, delicate pupal stage, the heat and pressure of the soil soon causes the death of the insect. This work is usually done with an extension disk, which permits of stirring the soil well up under the trees where most of the pupation takes place.

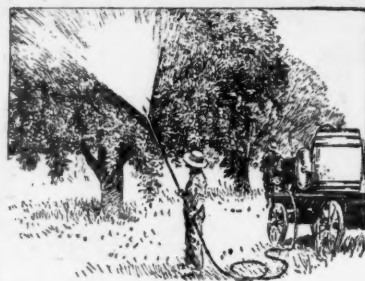
In orchards where the curculio has given considerable trouble, the surrounding woodlands, waste places, etc., are burned over during the following winter to destroy the adult beetles while they are in hibernation. Experiments have shown that the curculio infestation is usually much greater adjacent to a piece of woodlands which have been unmolested during the winter than it is adjacent to woodlands that have been burned over while the beetles are in hibernation.

Georgia's 1923 Peach Crop.

The quality of the peach crop in Georgia in 1923 was unquestionably the best since 1918. In 1919 and 1920 Georgia peach growers suffered severe losses from the curculio and brown rot. It has taken several years to bring pest conditions around to normal again. The program of work discussed in this article has turned the trick, and with the present information in hand, the Georgia growers feel that they are now better equipped to meet adverse peach pest conditions in the future.

The peach crop of the past season was also the second largest that has ever been produced in the state. A total of 8823 carloads were shipped during the season as compared with 7410 carloads in 1922 and 10,636 carloads in 1921. About 70 per cent of the 1923 crop was marketed f. o. b. the shipping point. There are now over 12,000,000 bearing and non-bearing peach trees in commercial orchards in Georgia, and a material increase in production is expected within the next few years.

BURN all the prunings of fruit trees, berry patches, etc. If possible, clean out rubbish in fence corners near the orchard and burn it. By so doing you will destroy many insects and large numbers of eggs.

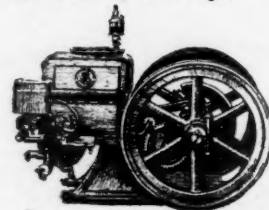


Spray thoroughly and harvest clean fruit

In hustling to spray your trees at just the right time, you can be thorough without being slow. Use a Hercules-powered sprayer and you'll get through quicker.

The Hercules engine puts thoroughness with speed in the job; pumps spray steadily for hours without rest, at 200 to 250 lbs. pressure. It is the same rugged and trouble-proof Hercules engine that is the standard farm engine of the world.

Farm machinery that is equipped with a Hercules engine by the manufacturer will get your work done faster. Manufacturers know that no machine can possibly be better than its power plant. They use the best of power, Hercules engines. Saw rigs, concrete mixers, feed cutters, pumps, hoists—many machines are now sold complete with Hercules engines. They range from 1½ H. P. up.



A Hercules dealer near you will gladly tell you why Hercules equipped farm machinery is most reliable. Or, we will be glad to have you write direct to us for help in planning power equipment to increase your farm and orchard profits.

The Hercules Corporation
Engine Division, Dept. H
Evansville, - Indiana

HERCULES
ENGINES

GOOD SEEDS

Grown From Select Stock — None Better — 54 years selling good seeds to satisfied customers. Prices below all others. Extra lot free in all orders I fill. Big free catalogue has over 700 pictures of vegetables and flowers. Settle your and neighbors' addresses. R. H. SHUMWAY, Rockford, Ill.

CENTAUR
SMALL FARM
TRACTOR

Displaces the Horse on the small farm. Pays for itself, in the saving of time, labor and Horse Feed. Makes the hard jobs easy. "New-Way" Air Cooled Motor, Hyatt Roller Bearings, Bosch Ignition, Automatic Governor, 13 inches Axle clearance.

Plows 7 inches Deep in Clay Sod. Riding Attachment for Harrowing, Dragging, Planting, Cultivating, Mowing, etc. A portable Power Plant for Sawing Wood, Grinding Feed and doing the many power jobs on the small farm. Costs only \$6 to \$10c per hour to run. Has REVERSE—

Backs On Its Own Power
4 years' successful performance has proven the CENTAUR the most economical, reliable and efficient small tractor made. LIBERAL TERMS. Write today for our special proposition.

THE CENTRAL TRACTOR CO.
42 Central Ave., Greenwich, O.



200,000 Growers proved its worth last year

APPLE BRANCHES SPRAYED WITH LIME SULFUR

Note how the poison on the left hand twig (sprayed with Lime-Sulfur alone) merely spots the surface. Contrast the complete durable coating shown on the right hand twig where KAYSO was used with Lime-Sulfur.



Without KAYSO

The arsenate of lead on these apples collected in drops and dried in scattered spots, leaving plenty of space exposed to infection and worms.

With KAYSO

These apples were sprayed in exactly the same way with arsenate of lead and KAYSO. Note how the KAYSO provided an even, all-over protective coating—thus protecting the fruit from harm.

PROVED IT—by scientific tests, yes!—but most of all by actual field use in thousands of orchards and gardens—under all sorts of climatic and weather conditions—on fruit, on vegetables, and on shade trees.

"I wouldn't waste another drop of spray solution without Kayso mixed in it," wrote Otto Bender, of Jefferson Barracks, Mo.

Growers know that a spray without a good spreader deposits only a spotty, unstable covering which leaves much of the surface exposed, and often causes blotches that mar the appearance of the fruit or vegetables. Almost a quarter million farmers and orchardists have found out that Kayso completely overcomes both these difficulties—and at a negligible cost.

Here's what some of your fellow-growers have to say about Kayso.

E. Karst of Orlando, Fla., prescribes and takes his own prescription: "I am owner of a citrus grove here and am also a commercial sprayer. I used KAYSO with lime-sulfur on my own grove and on other groves. I found it an excellent spreader and it causes the spray to stay on the trees much longer. I found it just as useful with Black Leaf 40, and shall continue to use it in all my work."

Ben Mattex of Sullivan, Ind., has found out that KAYSO is a "spreader" in every sense of the word: "In the past, the first two or three trees sprayed have always showed up very white with poison, but at the last of the barrel I could hardly tell which trees were sprayed. When I added KAYSO, the last trees showed just as much spray as the first ones."

Warren W. Oley, Manager for the Seabrook Company, Bridgeton, N. J., began as an experimenter but soon became a wholesale user: "While we started out in using the material only in an experimental way on about ten acres of peaches, the results were so good that we ended up by using KAYSO as a sticker and spreader in our spray material for over two hundred acres of bearing peaches and on bearing apples for the last three summer sprays. . . .

"We are so pleased with the results and with the commercial practical value on the two hundred acres last year that we intend to use it all the time when spraying our entire bearing peach orchards of four hundred and fifty acres, and will also use KAYSO in our summer sprays on our seven hundred acre apple orchards."

From Fort Valley, Ga., J. H. Allen writes of the efficiency and economy of KAYSO: "Previous to my use of KAYSO I had a quantity of burned fruit. On the block of early Bell and Alberta peaches on which KAYSO was used last season this burning was entirely eliminated. I also noted in using KAYSO that it enabled me to cover more trees with my tank of material and it gave a uniform spread over the fruit. . . . At the small cost of KAYSO, it practically doubles the value of the spray material."

How KAYSO gives greater coverage is shown by the experience of R. M. Hubbard, orchard manager for the South Jersey Fruit and Produce Farm: "The first tank of KAYSO dry mix that was applied fully convinced us of the ability of KAYSO as a spreader. Without the KAYSO in our tank it would not cover more than three and one-half rows of thirty trees each. The first tank containing KAYSO was

given to the man spraying, with no special instructions, and covered five full rows of thirty trees each. This considerable advantage was maintained during all the remaining sprays of the season."

Vegetable growers are also grateful to KAYSO. **Mayim Brothers of Ocala, Fla.,** say: "We find it excellent as a spreader for Bordeaux Mixture on cucumbers."

A. D. Smith, Jr., of Sanford, Fla., commends its use on another delicate product: "After an extended use of KAYSO in the spray on my celery fields I am more than satisfied with the results obtained."

Speaking as an authoritative tree expert, F. A. Bartlett of Stamford, Conn., testifies: "We have used two hundred pounds of KAYSO this year for fruit and shade tree work and we have estimated that the time saved in spraying and efficiency of this work as a result of using KAYSO has saved us several hundred dollars. It has lessened the amount of arsenate of lead used at least twenty-five per cent and we believe the work was better done. Very little of the spray material dripped from the trees sprayed with KAYSO. This was not the case before we used KAYSO."

And so we could go on quoting scores of other successful growers, as well as Agricultural Schools, State Departments and entomologists. But prove it yourself—mixed with Lime-Sulfur, Bordeaux, Arsenate of Lead, and all other sprays. Send the coupon below, to our New York office, for a trial package—enough for 200 gallons of spray!



**SPREADS
the SPRAY and**

**MAKES
it STAY~**

Send for the Proof!

Investigate for yourself! See how this remarkable spray spreader and adhesive will provide a uniform, lasting coating of poison to protect your fruit. Mail the coupon for explanatory booklets. Or better still, send 40 cents for a sample package. Put KAYSO to an actual orchard test.

**Golden State
Sales Corporation**
(Formerly California
Central Creameries, Inc.)
New York, Chicago, San
Francisco, Los Angeles
New York Address: 175
Franklin Street

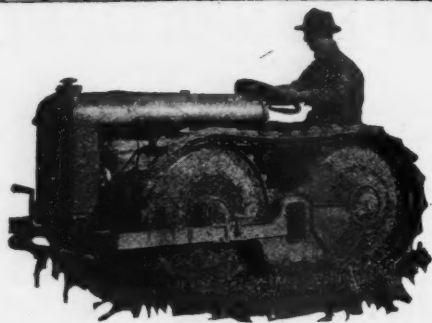
☐ Check here and enclose 40c for sample package of KAYSO—enough for 200 gallons.

☐ Check here for descriptive literature; including the testimony of spraying experts.

Name.....

Address.....

Town..... State..... A-3



Fordson Power plus "Crawler" Traction

ONE of the prime essentials an orchard tractor should have is ability to work successfully in soft, loose ground—without losing traction through slippage, and without skidding of front end of tractor.

Another essential is ability to turn square at row ends without throwing strain on the differential.

The JOHNSON TRACKPULL gives the Fordson both of these qualifications to a greater degree than possessed by any other tractor, or by any other traction attachment for Fordsons. Increased traction—14 H.P. drawbar capacity—is obtained by full length "muley" type tracks having 1000 square inches of traction surface. Square turning without differential strain is secured by means of two independent clutches.

Get the full service of which your Fordson is capable by adapting it to your conditions with the JOHNSON TRACKPULL. Write for complete descriptive information, price, etc. And see your Ford dealer.

A. G. JOHNSON PRODUCTS CO.
Dept. E-2 RACINE, WIS.

JOHNSON
TRACKPULL

Grapes

are in greater demand than ever before and are selling at prices that yield attractive profits to growers.

Practical viticulturists have learned that liberal quantities of nitrogen must be supplied to produce the most abundant crops. Experiments have shown that

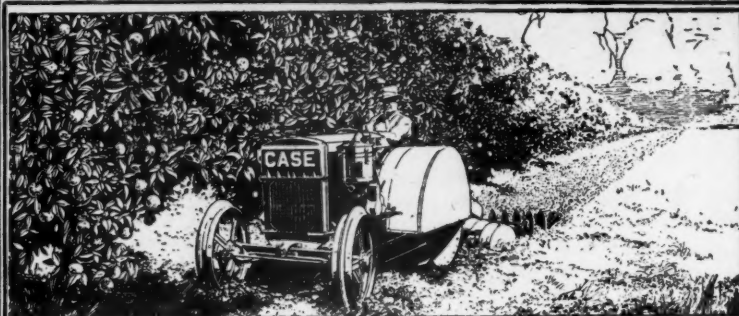
Nitrate of Soda

200 Pounds Per Acre
Early in Spring

supplies the necessary nitrogen in immediately available form at just the right time. All small fruit crops are found to profit greatly from the use of Nitrate of Soda nitrogen. And it is now recognized that it is almost useless to attempt to grow orchard fruits profitably without Nitrate of Soda.

My free Bulletin Service issued periodically is full of the latest and most authentic information on the proper use of nitrogen in its best form for all crops. If you wish to receive these bulletins, send me your name and address and to identify this advertisement add the number 3642.

Dr. Wm. S. Myers, Director, CHILEAN NITRATE COMMITTEE
25 Madison Avenue, New York



Make Your Orchard Pay

A Case tractor makes it easy to keep your orchard in paying condition, well cultivated and clean, because:

The Case tractor is well adapted to orchard work.
It is easy to handle, even in crowded orchards.
It is consistent in performance.
It is dependable in every climate and season.

But Case tractor usefulness is not limited to orchard work. The same tractor can be used for all heavy farm work, traction and belt, for hauling, road work or custom work. A Case tractor increases a farmer's opportunities for profit in many ways, and for many years.

Progressive fruit growers and farmers everywhere are finding it profitable to use Case tractors with Grand Detour plows, orchard harrows and tractor disks. These machines have no superior for the kind of orchard and farm work that pays best.

Write for a new book, "Modern Tractor Farming," full of helpful hints for farmers of the higher types.

J. I. Case Threshing Machine Co.

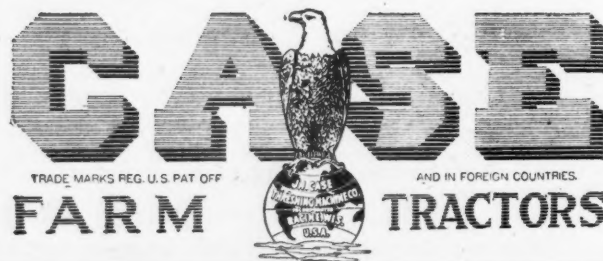
(Established 1842)

Dept. P-1

RACINE

WISCONSIN

NOTE—Our plows and Harrows are NOT the Case plows and harrows made by the J. I. Case Plow Works Company



Cherry Diseases and Their Control

(Continued from page 13.)

use Bordeaux and his neighbor will use lime-sulphur and each one is thoroughly convinced that the material he uses is the most satisfactory in every way.

There are several things to consider when deciding what material to use. Is it an effective fungicide, that is, will it control the diseases which attack the foliage and fruit? Will it injure the foliage? Will it have any undesirable effect on the fruit or foliage other than a direct spray injury?

Bordeaux mixture is undoubtedly an excellent fungicide but it also does some things that are not desirable. For instance, in many seasons, at least in some districts, it causes severe loss of leaves which is brought about by copper injury. There is also reason to believe that Bordeaux affects the fruit in a way which is not to the liking of the fruit growers.

Lime-sulphur solution has given excellent control of leaf-spot and brown-rot, even in seasons when conditions were most severe, and it is not likely to cause foliage injury. When all these things are considered, it seems that lime-sulphur should be given first place.

Spraying Schedule.

Cherry trees are seldom infested

with scale insects so that a dormant application is not necessary. They are occasionally found on trees of the sweet varieties and the trees should be sprayed when they are found, but sour cherry trees are practically immune. An application is sometimes made just before the blossoms open, but this is of doubtful value; and is not generally recommended. The spraying operations should begin soon after the blossoms fall and as here outlined.

First—Soon after the petals have dropped but not later than when the "shucks" have fallen from the small cherries.

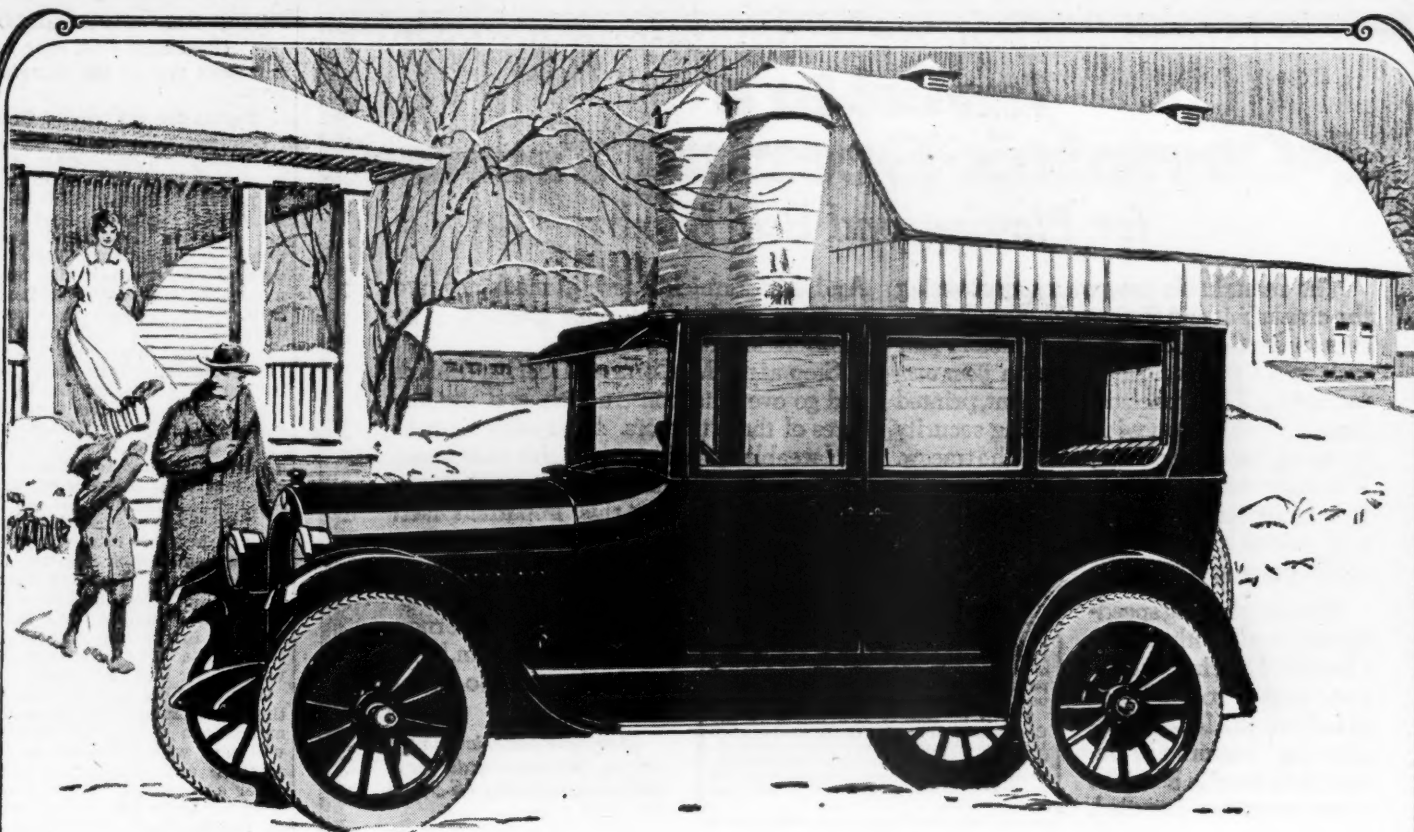
Second—Ten days to two weeks after the first application.

Third—Ten days to two weeks after the second application.

Fourth—Just after the cherries are harvested.

The number of applications recommended by experiment stations in various states may vary some from this, and as local men know their conditions best, it is advisable to follow their recommendations.

NO DOUBT you have found that the corners of your table oilcloth usually break long before the rest. You can prevent this breaking if you glue a piece of heavy muslin under the corners after you have fitted and before you have fastened the cloth to the table.



Your Family Needs This Car

Why spend around \$1100 for an open car when you can buy this Oldsmobile Six Sedan at the same cost?

This fine car gives you a sturdy body by Fisher, with wide deep seats, durable upholstery, heater, transmission lock, cowl ventilator and many other items of practical equipment. It gives you a 40 Horse Power "six" engine and high-grade chassis features, such as Delco ignition, Borg & Beck clutch, Alemite lubrication, oversize cord tires, etc.

All this for \$1095—thanks to Oldsmobile's manufacturing experience and General Motors' contributions through its staff of experts, great engineering laboratories, and vast purchasing power.

Put your farm on a sedan basis at the cost of an average touring car.

OLDS MOTOR WORKS, LANSING, MICHIGAN
Olds Motor Works of Canada, Ltd., Oshawa, Ont.

Genuine Oldsmobile parts can be purchased from any Oldsmobile dealer in any part of the United States, at a standard price established by the factory, without the addition of any war tax, handling, or transportation charges. Every Oldsmobile dealer has a master parts price list issued by us, which is always open for owners' inspection.

a **SIX**
Sedan at
\$1095

Touring Car	- - - -	\$ 750
Roadster	- - - -	750
Sport Touring	- - - -	885
Cab	- - - -	955
Coupe	- - - -	1035

The G. M. A. C. extended payment plan makes buying easy. All prices f. o. b. Lansing. Tax and spare tire extra

OLDSMOBILE ~ SIX

PRODUCT OF GENERAL MOTORS

Invest in a McCormick-Deering Tractor for Plowing and Belt Work

The remarkable new warranty covering the crankshaft and the crankshaft ball bearings in McCormick-Deering Tractors may well prove the deciding factor in *your own investment*. The ironclad agreement, printed below, provides you with a lasting security covering these important parts of the tractor. It is evidence of quality in the entire tractor. It is an indicator of practical design, accurate assembly, generous size of parts, and long life.

Do your plowing speedily and well with a McCormick-Deering and fit your tractor to all kinds of belt work. McCormick-Deering Tractors are designed to handle belt jobs as you want them handled.

SPECIAL WARRANTY given every purchaser

The seller agrees to replace free the Two-Bearing Crankshaft in any 10-20 or 15-30 McCormick-Deering tractor, should it break during the life of the tractor, provided the broken parts are promptly returned to the factory or one of the branch houses.

Further, the seller agrees to replace free any Crankshaft Ball Bearing in the 10-20 or 15-30 McCormick-Deering tractor, which may break, wear out, or burn out during the life of the tractor, provided that the defective ball bearing is promptly returned to the factory or one of the branch houses.

And McCormick-Deering machines are made to work right with tractors. The combination can't be beat.

Stop at the McCormick-Deering dealer's and go over the construction and the features of these tractors. Study the value of replaceable wearing parts, the unit main frame, ball and roller bearings at 28 points, etc. And remember this important fact:

When you buy a McCormick-Deering Tractor you get all necessary equipment—throttle governor, belt pulley, platform, fenders, brake, etc. No extras to pay for.

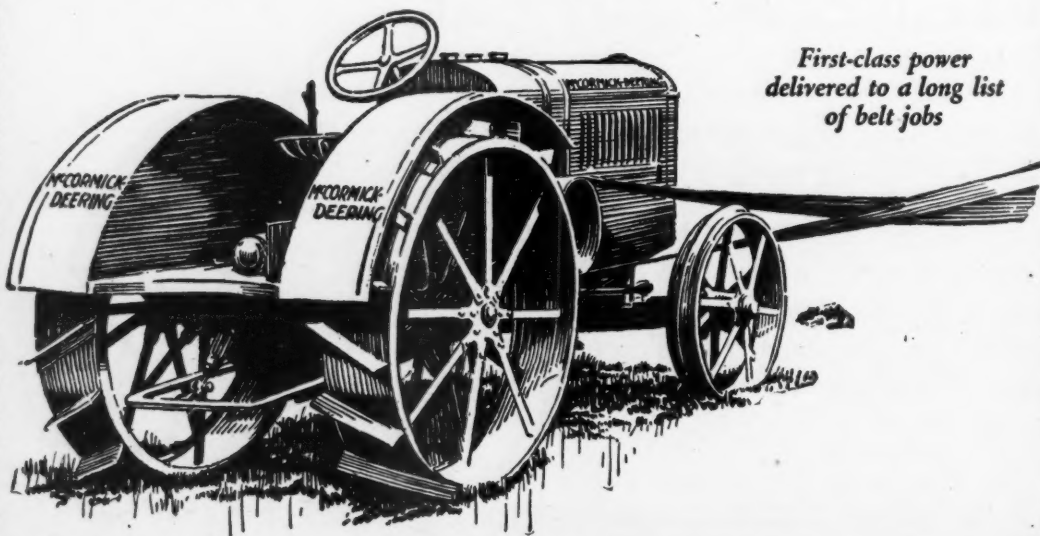
Make your power investment safe by placing an order for a McCormick-Deering 15-30 or 10-20 Tractor.

INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave.

of America
(Incorporated)

Chicago, Ill.



First-class power
delivered to a long list
of belt jobs

Notes on Spray Machinery

(Continued from page 12.)

important part of the spraying equipment.

Outfits for the Young Orchard.

Growers with 50 to 100 acres of young orchard are burdened with expense and have little relief in the way of returns. Paying \$300 to \$500 for a power sprayer looks like a big item to them, and because it takes comparatively little time to spray young trees, it ties up a lot of money for the few days the outfit is used. For growers so situated, the double-acting or tank pumps operating by hand have sometimes solved the problem. They may be placed in 100 to 200-gallon tanks, and the whole outfit may be mounted on a farm wagon. In one instance, two of these tank pumps took care of the spray needs in a 100-acre orchard for five years. It takes a sturdy, willing hand at the pump to furnish from one to one and one-fourth gallons per minute, but this rate will usually supply two small disk nozzles. This outfit costs from 75 to 120 dollars. On smaller acreages, barrel outfits costing 25 to 45 dollars may be used for the first few years. The limiting factor is the kind of labor available, with either style of outfit.

It should be pointed out here that the prices mentioned throughout this article are only approximate. They will vary with the make of outfit, the amount and quality of hose, and other accessories. Special equipment such as larger wheels and wider tires to lighten draft, and tanks of extra size also add to the purchase price.

Important Parts of a Spray Outfit. CYLINDERS.

The pumps on the majority of sprayers are of the force pump type, but there are one or two rotary pumps on the market also. These pumps may be driven by a belt, yoke, gear or chain, but the gear and chain drives are more commonly used. Belt drives were formerly more popular but belts wear out quickly and belt slippage results in the loss of power. Outfits are now constructed having one, two or three cylinder pumps. Four cylinder pumps have been added, but designers and manufacturers seem to favor three cylinder as sufficient for even large capacity work. Two and three cylinder pumps not only give greater nozzle capacity, but also more uniform pressure than the one cylinder outfit. Since it is the pump cylinder which comes in contact with spray material, it should be of special construction to withstand not only the wear due to friction, but that likely to occur from the corrosive action of spray materials. Brass, bronze and porcelain are non-corrosive and most pumps are so made that the cylinder consists merely of a brass tube, but one type is made of a cast iron sleeve lined on the inside with a brass cylinder. At least two manufacturers are now using a cast-iron cylinder lined on the inside with porcelain. Still another make of cylinder is constructed entirely of iron, but has a special packing, and since the wear comes entirely on the packing, which may be replaced, this cylinder is satisfactory.

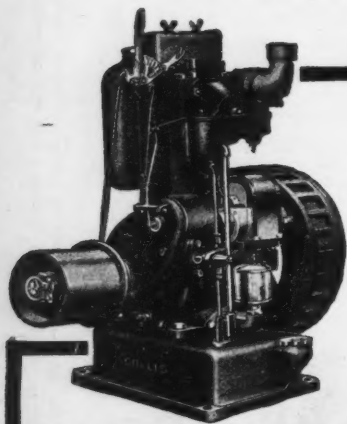
PLUNGERS.

Growers should be interested in the pump plunger because the plunger that is so constructed that the packing can be easily tightened or removed is more desirable. The kind of packing used is really of less importance, since one-half dozen kinds are in use, all more or less satisfactory.

VALVES.

Several types of valves are used in pumps, depending upon the capacity and the pressure desired. The ball valve is the type most generally used on garden or orchard sprayers. It is cheap, simple, seats quickly and effectively, wears evenly and offers little resistance to the passage of liquids. Valves should be accessible enough in the outfit to be easily cleaned when clogged with twigs, leaves, gaskets

(Continued on page 43.)



THE COLLIS GASOLINE ENGINE

For orchard spraying and dusting Collis is the peer of all power. Always ready to work—economical to operate—powerful—compact and light weight, Collis wins its way into the hearts of American orchardists.

Ask for our fruit spraying folder, prices and name of nearest dealer.

The COLLIS Company
1504 Lincoln Highway CLINTON, IOWA
Warehouse Stock: 233 N. 23d St., Philadelphia, Pa.



1,000,000 CHICKS

\$12 per 100 AND UP.

Postpaid and 100% live delivery guaranteed. From select heavy laying, pure bred, flocks. Leghorns, Rocks, Reds, Wyandottes, Minorcas, Anconas. Order circular and low prices today. Bank reference.

EAGLE NEST HATCHERY, Box 54, Upper Sandusky, Ohio

KITSELMAN FENCE

GET IT FROM THE FACTORY DIRECT

"I Saved \$28.40," says I. D. Wasson, Orbisonia, Pa. You, too, can save by buying direct at Lowest Factory Prices. WE PAY THE FREIGHT.

Write today for Free 100-page Catalog of Farm, Poultry and Lawn Fence, Gates, Posts and Barbed Wire.

KITSELMAN BROS., Dept. 206 MUNCIE, IND.

64 BREEDS

Most Profitable chickens, ducks, turkeys and geese.

Choice, pure-bred northern raised. Fowls, eggs and incubators at low prices. America's great poultry farm. At 31 years.


Valuable 100-page book and catalog free.

R.F. NEUBERT Co., Rt. 211, Mankato, Minn.

PLANS for Poultry Houses

All styles, 150 illustrations, secrets of getting winter eggs, and copy of "The Fall Egg Basket." Send 25 cents.

INLAND POULTRY JOURNAL, Dept. 20, Indianapolis, Ind.



Orchard Problems and their Solution

by Paul C. Stark
Associate Editor

Protecting Trees From Rabbits

A number of my young trees have been girdled around the base of the trunk. Please tell me if these trees can be saved?—H. B. R., Missouri.

YOUR question is a timely one as it is during the winter months when mice and rabbits often damage trees. In the fall, all rubbish, grass and weeds should be removed from the base of the trees. It is also sometimes advisable to mound up the soil to a height of six inches about the trees.

This will help to prevent mice injury, but rabbits are more difficult to control. Tree protectors have been found to be the best method of controlling rabbit injury. They are made of galvanized wire cloth material, rolled to fit the tree and after placing around the tree they should be shoved into the soil two or three inches to make solid and to prevent mice from crawling under the protector.

These wire protectors will last many years and can be used on younger orchards later on. However, ordinary building paper or newspapers can be tied around the young tree for rabbit protection and is much cheaper but temporary. Any trees which have already been girdled by mice or rabbits can probably be saved by bridge grafting, which has been fully described in previous issues.

Training and Fertilizing Grapes

Should a smaller grapevine be given more or less fertilizer than a larger one? What systems of training are best for Catawba, Brighton, Diamond and Niagara—systems to give maximum production of grapes—Kniffen or Chautauqua?—J. R. B., Pennsylvania.

IT IS generally true that a vine's capacity for utilizing plant food is based upon the amount of root system which it has. This in turn is closely related to the size of the vines. Thus we find that in general the larger applications of fertilizer should be given to the larger grapevines. If a vine is small because of its location in an area of poor soil, however, an extra addition of fertilizer, especially nitrate of soda, will do much to increase its growth in relation to the other vines.

There is no best system of training for grapevines. The Kniffen and Chautauqua systems are both commonly used, each being preferred to the other depending on the section of country. These two systems are alike in most respects in that approximately the same number of buds and canes are left in both instances, although trained in a slightly different manner. The number of buds and the general treatment of the vineyard has the greatest influence on fruit production.

Dehorning Peach Trees

Will dehorning 13-year-old peach trees which show unsound and discolored heartwood start new growth of any consequence? Is dehorning a good practice for old peach trees?—S. W. L., Ohio.

IF YOUR peach trees are in a fair condition of vigor and vitality, it would probably pay you to dehorn them even though some of the heartwood is unsound. All weak branches can be removed in pruning and the remaining branches will produce strong fruiting wood in one year's time. This will naturally be produced at points nearer the trunk of the tree where it will be more capable of supporting the weight of the fruit.

Dehorning is often a successful practice for peach trees when it will fall utterly in accomplishing the de-

sired results on apples and some other fruits. This is due to the fact that peaches are borne on vigorous one-year wood which is developed as a result of heavy pruning. If, however, the trees are in a very bad or weak condition, it would probably be a better plan to pull out the trees and set out a new orchard. Peach trees come into profitable bearing at a very early age and in a very few years equal the production of much older trees. The younger orchards are much more economically handled and more profitable than old orchards which are past their prime.

Origin of Stark's Golden Delicious

Can you tell me how the Golden Delicious apple was originated? Is it related at all to the Red Delicious?—I. W. K., Missouri.

THE ORIGIN of Stark's Golden Delicious apple is an intensely interesting story and yet very typical of the origin of practically all commercial varieties of apples. In other words, it is a so-called "chance seedling" and therefore nothing more than a tree which grew from the seed of an apple whose blossom was pollinated by chance.

The original Golden Delicious tree stands on a mountain side in the state of West Virginia, about 50 miles north-east of Charleston.

Golden Delicious is not related in any way to the Red Delicious, but because its shape and quality resemble the Red variety, it was named Golden Delicious. It is a late keeper and retains its rich quality in cold storage until late spring or summer.

Apple Scald

Please give description of scald. What causes scald on apples?—E. C. K., Indiana.

SCALD is a storage trouble caused by insufficient or improper ventilation in storage, in which the products of respiration are not carried off. These gases, when held in and around the fruit, result in a certain amount of breakdown in the fruit near the skin and cause a discoloration.

Scald can usually be controlled by ventilation of the storage. In recent years, however, it is being satisfactorily controlled by the use of the oiled paper wrappers which are relatively inexpensive. The oil used in such wrappers absorbs the injurious gases and prevents scalding of fruit. Well-colored fruit does not scald as badly as poorly colored fruit. Some varieties scald and others are practically free of scald.

Apple Blotch in South

I am told that Apple Blotch is more prevalent in the southern states. Is this true?—E. S. B., Indiana.

THIS is undoubtedly true as in the south the growing season is longer and more rain causes conditions which favor the growth of this disease. Farther north it is of little importance. To control, all parts of twigs and limbs having cankers should be cut out. This disease is largely controlled by the same sprays used against apple scab, although sometimes it is necessary to make additional special applications.

In well sprayed orchards the blotch cankers on the twigs are not apt to develop. Some of the ordinary apples (for example, Duchess and Ben Davis) are quite susceptible to blotch and the disease should never be allowed to gain a foothold.

Spraying, As a Science, In Infancy, But Developing. Increase Your Profits By Keeping Informed

Spraying is a comparatively new science. Only a few years ago when San Jose Scale became prevalent, followed by other insects and diseases, some suspected that fruit growing for profit was at an end.

The result has been that we can thank these vexatious troubles for finer fruit and better orchards and more profit from fruit growing than ever before; not by the haphazard grower, but by those who keep abreast of the times and operate on a scientific basis.

The entomologists and pathologists have studied how to control insects and diseases, and chemists have cooperated in making scientific preparations to accomplish the most good, at minimum expense and labor.

The General Chemical Company, with offices at 40 Rector Street, New York, with branches in various cities, with plants and mines at different places in the United States and Canada, with an investment of millions of dollars, employing thousands of persons with special ability and training for the work, have for years been specializing in studying the problems of fruit and vegetable growers.

The latest development of this company includes Dritomic Sulphur, a highly concentrated sulphur in dry form. It dissolves readily, flows freely, covering large areas with little material and under lower pressure than sprays carrying large quantities of inert material, thus greatly lessening mechanical injury.

Dritomic Sulphur contains ninety per cent of especially prepared sulphur, with ten per cent of adhesive and spreader, which does not decompose and disappear quickly, although spreading in a thin film on fruit and foliage.

It is valuable in the prevention of russetting of fruit, when the temperature is above seventy degrees Fahrenheit, and it can be used with an arsenical, by the addition of lime, for insects.

Dritomic Sulphur has been tested on the tender foliage of young trees.

In one test on an orchard of three-year-old peach trees, the foliage became so dense that the fruit could scarcely be seen; the trees yielded an average of three baskets of fungus-free fruit per tree.

The work of the General Chemical Company chemists has shown conclusively that the value of dusts, is dependent upon the process of the manufacture of the sulphur in the dust, and as a result, a dust has been produced, shown by actual tests to be far more effective than mixtures of ground sulphur combined with an arsenical. This dust is called ASP, because it is primarily for apples, strawberries and peaches.

ASP Dust should be used on apples at the beginning of the calyx spray, continuing as needed, through the season.

On strawberries, it satisfactorily combats the weevil and leaf roller as well as brown rot, leaf spot, powdery mildew and leak. This application is followed with another special dust called Fungi Dust.

ASP Dust is for use on peaches for curculio, scab and brown rot, also on plums and cherries, following with applications of Fungi Dust, which adds materially to the carrying quality of the fruit.

Other standard preparations of the Company include the well known BTS, one of the most remarkable and important combined insecticide and fungicide sprays, more effective and economical than lime-sulphur solution.

The Company also makes superior quality lime-sulphur solution, arsenate of lead, bordeaux powder, arsenite of zinc, calcium arsenate, atomic sulphur and various fish oil soaps.

Every fruit and vegetable grower should send for circulars of these various spray materials and dusts, which will be sent on application. If there are any special problems, help will be freely given. The circulars contain the most recent information regarding insecticides and fungicides and should enable growers to increase both their yields and profits.

—Advertisement.

Write for Book Today

FARM WAGONS

High or low wheels—steel or wood—wide or narrow tires. Steel or wood wheels to fit any running gear. Wagon parts of all kinds. Write today for free catalog illustrated in colors.

ELECTRIC WHEEL CO., 24 Elm Street, Quincy, Ill.

ROYAL FENCE



ARROW R.R. RAIL SECTION T-STEEL POSTS

Royal Fence pays for itself many times over in stock and property protection. Its better galvanizing means longer life; its sturdy dependability means satisfactory service.

Arrow T-Steel Posts are built like a railroad rail—the strongest construction known. Large Anchor Plates lock each post firmly into the ground; frequent notches provide easy means for attaching every, or any, line wire.

Ask your dealer.

AMERICAN STEEL & WIRE COMPANY

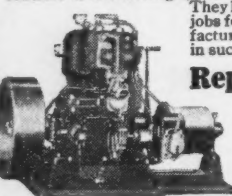
Chicago New York Boston Denver San Francisco

CUSHMAN POWER for Sprayers and Dusters

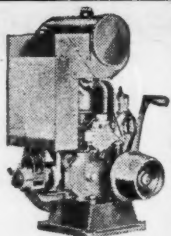
These well known vertical throttling-governed engines are used for power by many of the leading manufacturers who recognize the absolute necessity to the users of

Lighter Weight—Greater Capacity Higher Pressure

Cushman Engines are much lighter in weight, built more compactly and deliver more power per pound. They are dust-proof, steady in operation and require less attention. Regularly equipped with auto-type Carburetor and sensitive flyball-type Governor. Adapted for either belt or chain drive. Equipped with water tank, radiator or coil cooling system. Magneto or battery ignition.



6 to 8 H.P. Smooth running, 2-cylinder engine. Cooled by water pipe coil in bottom of spray solution tank. Special oil pump system for side hill operation. Weight 220 lbs.



4 H.P. Unit with radiator cooling. Magneto ignition. With or without clutch pulley. Weight 220 lbs.

They have been successfully used for many difficult "power drive" jobs for fifteen years and are well and favorably known by manufacturers, dealers and repair station mechanics. Many thousands in successful use all over the country.

Replace Your Engine with a Cushman

If you have a sprayer on which the engine does not operate satisfactorily, or deliver sufficient pressure or capacity, replace your motor with a Cushman and get more power with less weight.

Write us the sprayer you use, or expect to buy, and we shall tell you what equipment and power is best for your purpose.

Cushman Motor Works
955 North 21st Street, Lincoln, Nebr.

HUDSON

Sprayers DO Spray

Beware the low pressure sprinker—good spraying demands high pressure. The extra capacity HUDSON pump and the sturdy tank riveted like a steam boiler, insure the highest working pressure of any compressed air type. Get this Free Book

The High Pressure Sprayer
Equipped with a combination nozzle for light or heavy mixtures. Leak-proof shut-off. Can be furnished with an extension for spraying fruit trees. Free Book—"When, What and How to Spray." Write today for your copy or ask your Home Town Hudson Dealer.

The Hudson Misty does fine work on small jobs. Thousands in use. Strong, double seamed, leakproof.

HUDSON MFG. CO.

Dept. 4272

Minneapolis, Minn.



Send Us

Your renewal subscription and the subscription of just one of your neighbors—and we will send you the FULTON DOCUMENT SAFE illustrated above.

If your subscription has not as yet expired you may have it extended or send us two new subscribers and we will send you this safe free, postage prepaid.

Just the thing for keeping your valuable papers, deeds, fire and life insurance policies, notes, mortgages, etc. Unlike the ordinary document box. No keys or locks to pick. Has a three tumbler combination lock which only the owner can operate.

Made of Bessemer steel, finished in black enamel, size 11½x5½x2½. Attractive in appearance as it is practical.

Subscription rate, 3 years for \$1.00.
AMERICAN FRUIT GROWER MAGAZINE

53 W. Jackson Blvd. Chicago

Too Good to Last!

For Immediate Acceptance Only

McCall's	6 Mo.	All Four for \$1.50
McClure's	6 Mo.	
Farm & Home	1 Yr.	
American Fruit Grower	1 Yr.	

Mention Club No. 16

Send your remittance to

American Fruit Grower Magazine
542 Monadnock Block—Chicago

OUR SPECIAL \$2.25 value for \$1.60

Western Poultry Journal - 1 yr.
Gleanings in Bee Culture - 1 yr.
American Fruit Grower Magazine - 2 yr.

Think of it! All Three Magazines for \$1.60

Send your remittance to

American Fruit Grower Magazine
53 W. Jackson Blvd. CHICAGO

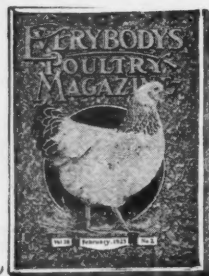
A REMARKABLE OFFER

Club No. 15

Farm & Home	1 yr.	All Three for \$1.00
"O. K." Poultry Journal	1 yr.	
American Fruit Grower	2 yrs.	

A Dollar Bill Will Do—We Take The Risk

American Fruit Grower Magazine
53 W. Jackson Blvd., Chicago



Poultry and Fruit Go Hand in Hand

We have made arrangements whereby every reader of the AMERICAN FRUIT GROWER can also receive at little cost America's Most Popular Poultry Publication, Everybody's Poultry Magazine—a big live poultry monthly of from 64 to 150 pages—edited by practical poultrymen and who are this country's leading authorities.

Everybody's Poultry Magazine (1 year)
Amer. Fruit Grower Magazine (2 years)

Both for Only \$1.00

It is remarkable the number of poultrymen who are also Fruit Growers. Everybody's contains a New Feature, Horticultural Department, conducted by Prof. Arthur J. Farley of the New Brunswick, N. J., Agricultural College. You will like EVERYBODY'S. Every issue is worth a year's subscription price. Send your order direct to us.

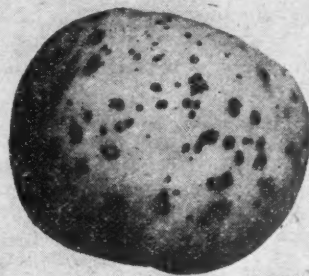
AMERICAN FRUIT GROWER
53 West Jackson Boulevard CHICAGO

Phoma Fruit Spot of Apples

(Continued from page 14.)

They are more highly colored than the surrounding skin of the apple, taking a deep red, or a black when on red or bluish areas of the fruit, and a dark green when on green or yellow fruit surfaces. The center of the spot is usually speckled or flecked with black, giving an appearance that does no occur on any other spot disease of the apple. If a very thin peel is removed, the flecked appearance is seen to still better advantage. Some of the minute black specks may have been removed with the peel but those that remain stand out in striking contrast with the white flesh of the apple and can be readily seen with the naked eye.

The Phoma fruit spots are rather irregular in outline and the ground color of the spots usually shades off gradually into that of the surrounding skin. The spots are shallow, usually affecting only the skin tissue and completely removed with a thick peel. The spot area is usually slightly depressed but has little or no collapsed or corky flesh be-



Phoma fruit spot after cellar storage.

neath. The spots are usually more abundant on the blossom half of the apple than on the stem half.

There are a number of other spots that have been confused with Phoma fruit spot, among which are Jonathan Spot and Bitter Pit or Baldwin Spot. Jonathan spots are more superficial than Phoma fruit spots, and, as found at picking time, are entirely removed by the thinnest possible peel. The spots are brown or black in color, circular in outline and one-sixteenth to one-eighth inch in diameter.

Bitter pit is characterized by the development of small brown spots or streaks in the flesh of the apple, most abundant just beneath the skin but sometimes spreading deep into the flesh. The disease is evident on the surface as sunken bruise-like spots that sometimes resemble the Phoma spots. The two diseases can always be distinguished by the fact that a moderately thick peel entirely removes the Phoma fruit spots but merely exposes the corky tissue beneath the bitter pit spots, making the disease all the more evident.

Development of Phoma Fruit Spot.

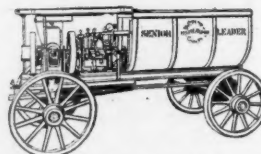
The description given above for Phoma fruit spot applies particularly to the disease as it is seen at picking time. The spots sometimes begin to show as early as the middle of August but are very faint at this time and usually overlooked. If the fruit is placed in cold storage immediately after picking, the spots usually make but little further development. They may sometimes become a little more sunken and develop a small amount of corky tissue beneath the skin, but the changes are not usually sufficient to make the disease of importance from the storage standpoint. If the apples are held in common storage, or are delayed in reaching cold storage, the results may be quite different. The spots that are evident at picking time may become more sunken and considerably enlarged and develop a distinct corky layer immediately beneath the skin; and numerous minute specks that are likely to be overlooked at picking time may

(Concluded on page 53.)

SPRAY with the OSPRAYMO High Pressure Machines

High Pressure means a mist which stays on the foliage and makes the job effective. High Pressure is the secret of success and HIGH PRESSURE is simply another name for

OSPRAYMO



Gasoline Engine Orchard Sprayer

All these machines have our last word in mechanical agitators, with two stiff Adjustable Brushes working automatically in cleaning the suction strainers—no clogged pipes or nozzles with the OSPRAYMO line. Our slogan—

A Spray for Every Need.
High Pressure Guaranteed.

Ask for our Catalog No. 42, and don't buy until it comes.

FIELD FORCE PUMP CO.

Dept. B, Elmira, N. Y.

41 years at Sprayer Building

DESTROY FIELD MICE

If your garden or orchard is infested with field mice write us and we will send you a free booklet telling how to destroy them without the use of traps or virulent poisons.

PARKE, DAVIS & CO.
DEPT. A

DETROIT, MICH.

DON'T WEAR A TRUSS

BE COMFORTABLE—

Wear the Brooks Appliance, the modern scientific invention which gives rupture sufferers immediate relief. It has no obnoxious springs or pads. Automatic Air Cushions bind and draw together the broken parts. No salves or plasters. Durable. Cheap. Sent on trial to prove its worth. Beware of imitations. Look for trade-mark bearing portrait and signature of C. E. Brooks which appears on every Appliance. None other genuine. Full information and booklet sent free in plain, sealed envelope.

BROOKS APPLIANCE CO., 213 State St., Marshall, Mich.

Power Cultivator

Does work of 4 men or 1 horse—heavy cultivating or light—fast or slow; cultivates around trees and bushes. Easily operated and steered; simple, sturdy. Automatic lubrication, dust-proof working parts and our own 4-H.P., 4-cycle air-cooled engine. Uses hand or light home tools.

M. B. N. MANUFACTURING CO.
372 Reed St. Milwaukee, Wis.



\$12.50 Goodyear Raincoat Free

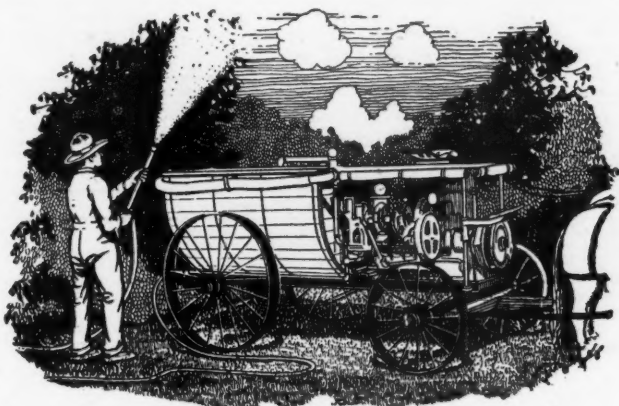
Goodyear Mfg. Co., 6362-R, Goodyear Bldg., Kansas City, Mo., is making an offer to send a handsome raincoat free to one person in each locality who will show and recommend it to friends. If you want one, write today.

United Paper Company Atlanta, Georgia

Printed or Plain Oiled Apple Wrappers

We are the largest producers of fruit wrappers in the country. Write us for samples and prices.

Whether You Spray or Dust Use a "BEAN" for Best Results



Bean Giant Triplex Sprayer, capacity 12 gal. per minute

"Bean" Power Sprayers

The annual toll taken from the growers of this country by fruit pests is appalling. It is the neglected and the poorly sprayed or dusted orchards that pay the bill.

A Good Sprayer an Economy

There is no sense or saving in trying to get along with an inefficient rig or a makeshift outfit, when your trees demand something better. A first class, high grade sprayer is a real economy. It costs less in the end and it does faster, better work every day you have it on the job. If you haven't adequate spraying equipment you can add dollars to your income by securing a high grade modern Bean Sprayer.

Bean Built-In Dependability

Designed for highly effective work, rapid coverage, and utmost mechanical ruggedness, Bean Sprayers are making money and saving money for growers every spraying day of the year. Bean dependability is the built-in result of 40 years of experience.

The Bean Pressure Regulator saves fuel in the engine and wear and tear in the pump; and enables you to take out any valve in two minutes without stopping the engine, losing the pressure, or drawing the liquid from the pump. Bean Threadless Ball Valves can be flushed out in a jiffy and can never stick or give trouble. Bean Porcelain Cylinders give years of service without attention. The Bean Pump has no stuffing boxes, hence no stuffing box troubles.

Sizes to Meet All Requirements

Bean Power Sprayers are built in all sizes from the dependable little one-man Simplicity with a capacity of 5½ gallons a minute to the Bean Super-Giant with a capacity of 23 gallons a minute, every outfit thoroly guaranteed in every way.



Bean 4 H. P. Duster for Orchard Work

"Bean" Power Dusters

Where insecticides and fungicides are applied in their dry form, a Bean Power Duster affords the most effective means of doing the work.

Thoro Coverage Insures Results

The Bean delivers a dense all-enveloping cloud of dust which reaches every part of tree or plant. This is the result of perfect agitation, positive regulated feed, and uniform mixing of materials and air in the fan.

Dust Mixed in the Machine

This self-mixing feature is the greatest improvement in dusting machines since dusting was first introduced. Simply put the materials into the hopper, start the engine and in 2 or 3 minutes they are thoroly mixed. Then open the feed regulator and the dust passes thru the high speed fan and out thru the nozzle in a perfectly uniform flow. This cuts the cost of materials practically in half and insures added effectiveness of such materials as nico-dust which gives best results when applied moist and warm (a condition produced by the mixing process).

A quick and easy change of the feeder arm is made for sulphur and other dusts not requiring mixing.

Most Simple Outfits on the Market

Bean dusters have but one shaft and one belt. No gears, chains, or other mechanism to get out of order, or cause trouble of any kind. Simplicity means satisfaction.

Truck Dusters Orchard Dusters

Two-wheel type for truck crops and vineyard use; 4 wheel type for orchard work. The dusters are generally equipped with the dependable Bean 4 H. P. Bean Engine. They can also be furnished with 2 or 3 H. P. engines for lighter service. The Bean guarantee is an assurance of good service.

BEAN SPRAY PUMP CO.
Please send me your New Sprayer Catalog and Booklet of "Better Spraying."
Name.....
Street.....
Town.....
State.....
Kind of Fruit.....
No. of acres.....
50-551

Sign and send the coupon
for full information on
the Bean line for 1924.



BEAN SPRAY PUMP CO.

Established 1884

15 Hosmer Street
LANSING, MICH.

104 W. Julian Street
SAN JOSE, CAL.

BEAN SPRAYERS

BEAN DUSTERS

Sign and send the coupon
for full information on
the duster you desire.



BEAN SPRAY PUMP CO.
Please send me full information on
Truck Dusters Orchard Dusters
Name.....
Street.....
Town.....
State.....
No. of Acres.....
50-551

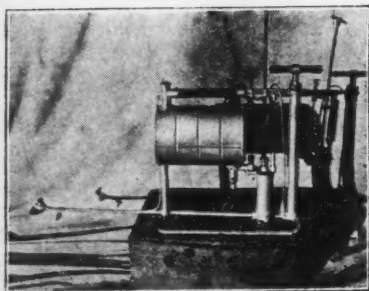
Spray Calendar for Florida Fruits

By W. L. Floyd, University of Florida

For Grapefruit and Satsumas				For Avocado			
Pest.	Time.	Remedy.	Remarks.	Pest.	Time.	Remedy.	Remarks.
Scab.	February or March. Just before growth starts.	Bordeaux-oil Mixture 3-3-50 Bordeaux, add concentrated oil emulsion to give 1 per cent of oil to the mixture.	Important in preventing scab on young growth.	Scab. (Cladosporium (Citr). Black Spot. (Colletotrichum sp.) Blotch. (Cercospora sp.)	March. (1) Latter part of blooming period. (2) Three weeks later. (3) Three or 4 weeks later.	3-3-50 Bordeaux Mixture.	Three sprayings are usually sufficient, though a fourth may sometimes be necessary.
For All Species of Citrus				For Mango			
White Fly. Scale Insects. Rust mites.	May. When fruit is 1 in. in diameter.	Oil emulsion diluted to contain 1 part oil to 90 parts water, then add 2½ lbs. dry soda-sulphur to 100 gal.	Oil emulsion sometimes injures small fruit; it should be 1 in. or over in diameter to be safe.	Anthracnose (Colletotrichum gloeosporioides). Blossom Anomala.	March. When in bloom.	3-3-50 Bordeaux Mixture, 1½ lbs. arsenate of lead.	
Rust mites. Red Spiders.	June. During dry weather.	Dust with Flowers of Sulphur, or spray with lime-sulphur, 1 gal. to 50 gal. water.	Watch for mites. Apply before they become numerous.	Red Spiders. Leaf Thrips.	November to March, when pests are found.	Lime-Sulphur, 1 to 60 plus 40 per cent Nicotine sulphate, 1 to 900.	Repeat as often as necessary.
White Fly. Scale Insects.	Early in July. After rainy season begins.	Parasitic Fungus. Red Aschersonia. Red-headed fungus.	Dissolve spores off in water, strain and apply with a clean hand sprayer. If obtainable add spores of Brown, Gray-headed and Black fungi.	Flower Thrips. Blossom Anomala. Leaf Roller.	Early March when in bloom if pests are found.	40 per cent nicotine sulphate, 13 oz. to 100 gal. water, then add fish oil soap 2 lbs., arsenate of lead, 3 lbs.	Unless thrips are numerous omit nicotine sulphate and soap.
White Fly. Scale Insects. Rust mites.	October or November.	Oil Emulsion in which soda-sulphur is dissolved.	Same proportions as given in second.	For Pineapple			
Special Spraying Not Usually Necessary Under Normal Conditions				Soft Rot. (Thielaviopsis paradoxa.)	Fruit after ripening.	Careful handling. Packing only when dry. Prompt shipment.	Sometimes severe among pine-apples in transit.
Scab.	Early February. Before new foliage unfolds.	Bordeaux-oil mixture	Same as first on Grapefruit and Satsumas where much scab is present. Important on young non-bearing trees. Prune out diseased parts as much as possible before spraying.	Red Wilt. (Caused by nematode.)	Six to 8 weeks before setting plants.	Breaking soil deep then applying calcium cyanamid, 1 ton to acre.	Too expensive for general use.
Thrips.	March. When about one-half the petals have fallen.	Nicotine sulphate with lime-sulphur. Use 13 oz. nicotine sulphate and 2½ gal. lime-sulphur to 100 gal. water. More often necessary on Satsumas.	Apply when 25 or more thrips are found to the blossom.	Red Spiders. Mealy Bugs.	In periods of dry weather.	Handful of tobacco dust in bud of plant.	
Rust mites. Red Spiders.	August or September. When mites become noticeable.	Dust with flowers of sulphur, or spray with lime-sulphur 1 to 50.	Watch for mites if weather becomes dry. Apply before they become numerous.				

Insect Pest Control in Southern California

by Hugh Knight
Citrus Experiment Station



Atomizing machine by means of which accurate dosages of hydrocyanic acid are delivered under the tent.

FUMIGATION with atomized liquid hydrocyanic acid is still the standard and most efficient method of control for scale pests of citrus trees in Southern California. And this, in spite of the fact that there are sections in which, for several seasons past, fumigation has yielded very unsatisfactory results.

Insects Becoming More Resistant to Gas.

The reason for this is not that the method itself is any less efficient than formerly; on the contrary it is considerably more so, but is due to the fact that the insects themselves are becoming more resistant to the gas. Two notable instances of this are to be found in the resistant red scale of the Corona section, and in the black scale of the Charter-Oak-Covina section.

Resistance Occasioned in Three Ways

Resistance to the effects of hydrocyanic acid gas is occasioned in three ways. First—by a gradual process of natural selection over a long period (an apt illustration of the survival of the fittest). Second—by the state of the insect itself, with reference to its life history, at the time of fumigation. Third—by the effects of its environment, with special reference to low temperature.

We will consider briefly some of the factors bearing on this question.

First—if it were possible to obtain a complete kill of scale, that is to say, eradication, resistance would be unheard of. In actual practice with present-day equipment this is not possible.

It is quite obvious that in order to kill insects by means of fumigation, they must be subjected to a certain

period of time, double the amount of hydrocyanic acid is used that would be required in the case of a gas-tight cover.

Factors Which Affect Gas Diffusion.

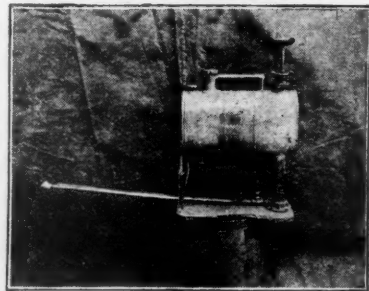
There are a number of ever-changing factors that affect gas diffusion both within and through the tent. A



Making a determination of "kill" after fumigation in a lemon grove in Southern California.

definite concentration of gas for a definite period of time. As a matter of fact, this is never accomplished in the field. The best of canvas covers have a very high leakage factor. In order to overcome the loss of gas through leakage and to maintain a killing concentration over the required

hot gas diffuses more rapidly than a cold gas, not only within but also through the tent, thus increasing the leakage factor. It rises to the top of the tent and its greatest concentration is reached at that point. Cold gas, on the other hand, does not diffuse quite as rapidly; it tends to



Another type of atomizing machine.

maintain its concentration toward the lower part of the enclosed area (where the greater part of the scale are found); it is not quite as active as hot gas and consequently maintains a somewhat higher concentration and is therefore more efficient.

Diffusion of gas within the tent is not uniform, that is to say, the concentration varies very considerably in different parts of the tent. This in itself affects the kill of scale. Motionless air is a very rare thing. There is generally more or less air movement and while it may not be noticeable and may not be sufficient to flap the tent, it is still sufficient to affect gas diffusion in such manner that the higher concentration is maintained on the leeward side. It is a matter of common knowledge that more live scale are found on the windward side of the tree, and if any survive, that is the most likely place to find them.

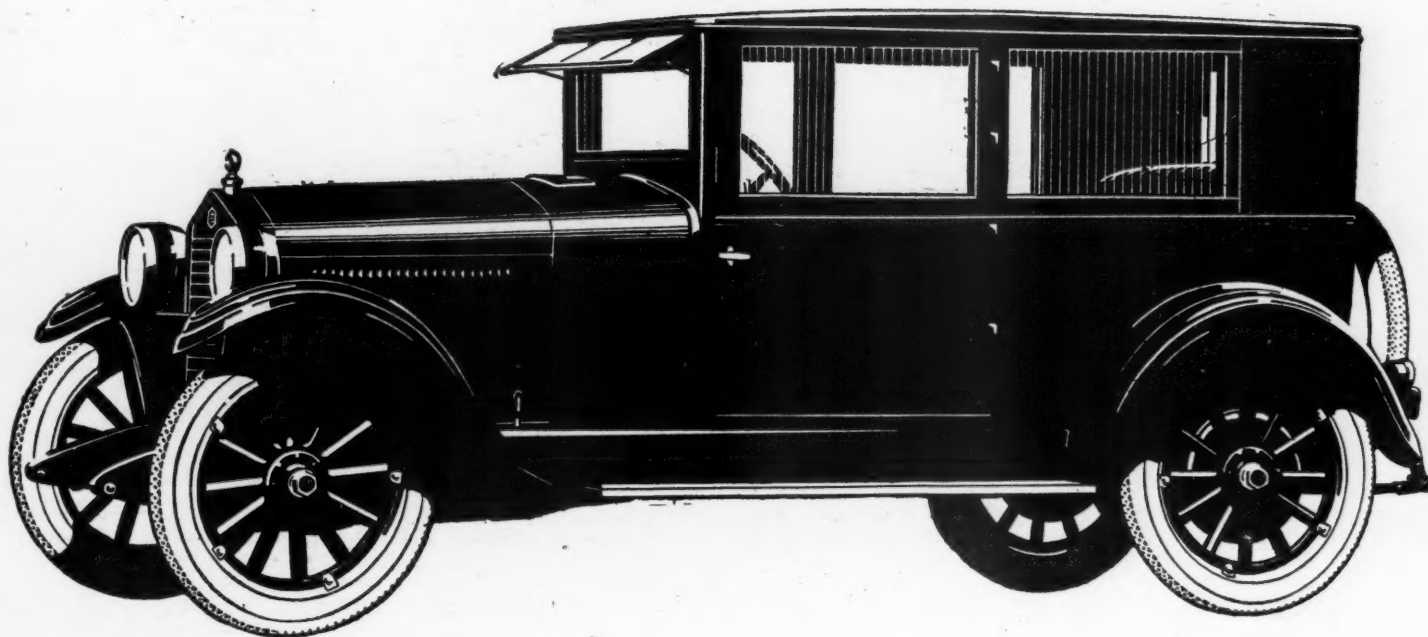
Wherever the concentration of gas is not sufficient to kill all the scale, it is self-evident that the strongest and most resistant, those scale with the greatest vitality, will be the ones that survive, all the weak individuals being killed first. The next generation produced by these survivors are again subjected to the same process, etc. After a few years' time, it would be wonderful indeed if increased resistance to the gas did not become manifest. That this actually takes place is shown by the fact that red

(Continued from page 32.)

The New ESSEX

A SIX

Built by Hudson under Hudson Patents



A 30 Minute Ride Will Win You

Essex closed car comforts now cost \$170 less than ever before. Also with this lower price is an even more attractive Coach body and a six cylinder motor built on the principle of the famous Hudson Super-Six.

It continues Essex qualities of economy and reliability, known to 135,000 owners. It adds a smoothness of performance which heretofore was exclusively Hudson's. Both cars are alike in all details that count for long, satisfactory service at small operating cost.

You will like the new Essex in the nimble ease of its operation. Gears shift quietly. Steering is like guiding a bicycle, and care of the car calls for little more than keeping it lubricated. That, for the most part, is done with an oil can.

The chassis design lowers the center of gravity, giving greater comfort and safety, at all speeds, on all roads. You will be interested in seeing how this is accomplished.

Greater fuel economy is obtained. The car is lighter, longer and roomier. You will agree that from the standpoint of appearance, delightful performance, cost and reliability, the new Essex provides ideal transportation.

The
Coach
\$975

Touring Model - \$850

Freight and Tax Extra

ESSEX MOTORS

DETROIT, MICHIGAN

Spraying Calendar for Rocky Mountain District

By M. C. Merrill, Brigham Young University

What to Spray For.	Treatment.	When to Spray.	What to Spray For.	Treatment.	When to Spray.
Codling Moth.	Arsenate of Lead 1-2 lbs. to 50 gal. water, or 3 lbs. to 100 gal. water. For newly hatched insects make solution stronger; for old or large insects use double quantity.	(1) Spray immediately after petals have fallen. (2) Spray 10 days or 2 weeks later. (3) Spray one month later. (4) Spray later as necessary. Use powdered form of arsenate of lead.	Bud Moth.	Arsenate of lead. Same strength as for codling moth; later sprays stronger.	Just before the flower buds open.
San Jose Scale.	Lime-sulphur, 1 to 8, or miscible oil.	In dormant season as late as possible before buds open.	Apple Leaf Hopper.	Dip nursery stock in soap solution; spray with a tobacco solution on underside of leaves.	Early in season before winged stage appears.
Woolly Aphis.	Nicotine sulphate, 1 pt. to 100 gal. of water; or 15% kerosene emulsion; to either of these add 3 lbs. dissolved soap per 100 gal. Or paint affected parts with pure kerosene or crude petroleum. Some of these sprays may be added to the arsenate of lead sprays used for codling moth.	Any time when insects appear on the trees. Commonly done in fall after harvest but safer to do so earlier in season.	Thrips.	Nicotine. Repeat as needed.	Just as buds begin to unfold.
Oyster Shell Scale.	Concentrated tobacco solution, 2 pt. to 10 gal. of water; or 8% kerosene emulsion.	In the spring when the eggs are hatching.	Flea Beetle.	Spray affected nursery stock with arsenate of lead, 3 lbs. to 100 gal. water.	When insect appears.
Red Spider.	Clear cold water or concentrated tobacco solution, 2 pt. to 100 gal. of water; with either of these use 3 lbs. of dissolved soap per hundred gal. A mixture of lime-sulphur, casein and water may also be used.	Summer time when the spiders appear.	Apple Curculio.	Destroy hibernating places and cultivate the soil. Prune orchards and spray with arsenate of lead, 3 lbs. to 100 gal. of water.	When insect appears.
Pear or Cherry Slug.	Arsenate of lead, 3 lbs. to 100 gal. of water; white hellebore, 1 oz. to 3 gal. of water; nicotine, 1 part to 800 parts of water.	In spring, or when insects first appear.	Plum Curculio.	Eliminate rubbish, destroy hibernating places and cultivate the soil; destroy fallen fruit. Spray with arsenate of lead, 3 lbs. to 100 gal. water.	When leaf buds are opening. Again after petals have fallen.
Tent Caterpillar.	Codling moth spray controls. Prune egg masses and burn, also burn the tent masses of the caterpillars.	In early spring as soon as found; or just before larvae begin damage.	Putnam's Scale.	Same as for San Jose scale.	Dormant season.
Fruit-tree Leaf Roller.	Miscible oil during dormant season to destroy egg masses; double strength codling moth spray just as buds are opening.	Miscible oil in early spring or any time during dormant season; arsenate of lead as buds are opening.	European Fruit Scale.	Lime-sulphur, 1 to 8.	Dormant season.
Fruit Tree Bark Beetle.	Keep trees in vigorous condition by cultural methods. Prune out dead limbs and burn.	Pruning best done in early spring.	Round-headed and Flat-headed Apple-tree Borers.	Cutting out with knife or wire, prevent egg laying on trunk by wrapping with paper, protect tree by painting trunk with pure white lead and linseed oil.	Before eggs laid in June and July, and upon appearance of insect.
Peach Tree-borer.	Old method: shield trunks with paper to prevent egg laying. Remove or kill borers with knife or wire. New method: Apply paradichlorobenzene treatment to soil at base of trunk, one ounce to each tree. This treatment is recommended for trees 6 years or older.	Paradichlorobenzene treatment during dry weather in early September.	Fire Blight.	Cut out affected parts, removing cankered branches in dormant season and blighted branches as they appear in spring and summer. Sterilize wound and pruning tools with mercuric cyanide solution. Keep trees free from Red Spider and Aphis and plant resistant varieties.	As disease appears.
Peach Twig-borer.	Lime-sulphur, 1 to 8. Arsenate of lead, 3 lbs. to 100 gal. of water.	Just before buds open; just as leaf buds are opening, and later in the season just before peaches ripen.	Powdery Mildew.	Prune and burn affected parts. Lime-sulphur, 1 to 8. Bordeaux mixture.	As disease appears. In dormant season. In summer as necessary.
Buffalo Tree Hopper.	Clean cultivation; destroy weeds and burn pruned wood.	Pruning during early spring; cultivation during early summer.	California Peach Blight.	Prune and renovate orchard. Lime-sulphur, 1 to 8. Bordeaux mixture 5-5-50, or lime-sulphur 1 to 40.	In early spring. Dormant season. In summer as necessary.
Grasshoppers and Crickets.	Use spring tooth harrow on breeding ground. Sow broadcast sodium arsenite-bran mash where crops are being devoured. Made as follows: Bran (free of shorts), 100 lbs.; salt, 5 lbs.; amyl acetate, 3 oz.; sodium arsenite, 1 1/2 pt.; sugar beet refuse molasses, 2 gal.; water, 8 gal. One to 3 oz. sodium arsenite used to 100 lbs. of bran. Mechanical traps also used.	Whenever they appear in numbers.	Peach Leaf Curl.	Lime-sulphur 1 to 8 or Bordeaux Mixture.	Before buds open.
Strawberry Leaf Roller.	Arsenate of lead, 3 lbs. to 100 gal. of water. Repeat this spray. Also cut leaves and burn.	Soon after adult moths appear. Ten days after first spray.	Apple Scab.	Copper sulphate, 4 lbs. to 45 gal. of water or Bordeaux Mixture once or twice.	Before fruit buds open.
Pear Leaf Blister Mite.	Lime-sulphur 1 to 8; miscible oil; concentrated tobacco solution; 20% kerosene emulsion.	Dormant season, or just as leaf buds are opening.	REMARKS ON SPRAYING CALENDAR FOR ROCKY MOUNTAIN DISTRICT. Codling Moth.—The powdered form of arsenate of lead is recommended. If the paste form is used the amount indicated should be doubled. When spraying frequent or constant stirring is necessary. For the cover sprays a spreader is recommended. The calyx spray should be applied before the calyx lobes close. San Jose Scale.—Where trees are old and severely infested and their vitality is low, they should be removed and burned. Because of not having the deleterious action on the skin which lime-sulphur does, miscible oils are recommended where they are equally effective as dormant sprays. Woolly Aphis.—Bandaging the trunks of the trees to trap the insects as they crawl down to the soil in the fall is sometimes recommended. Tanglefoot bands may be used to prevent aphids and ants crawling up the trunks of the trees in the spring. Oyster Shell Scale.—Some consider regular dormant sprays applied during dormant season as ineffective to control this insect unless applied when eggs are hatching. Nicotine, 1 qt. to 800 qt. of water, to which has been added 7 lbs. of soap, sometimes recommended. Red Spider.—Watch out for red spider during unusually dry seasons. Pear or Cherry Slug.—This insect is doing extensive damage to cherry orchards throughout the Rocky Mountain district. This condition is unnecessary because the insect is very easily controlled. Tent Caterpillar.—Rarely does serious damage two seasons in succession because of parasites which keep it in check. Fruit Tree Leaf Roller.—Miscible oil applied as late as May 3 has given effective results. The later arsenate of lead cover sprays used double strength have also given good results in controlling the leaf roller. To protect the honey bees spraying with arsenate of lead should not be done while the trees are in bloom. This insect is getting to be a serious pest in parts of the west. Fruit Tree Bark Beetle.—Some recommend white-washing the trunks and branches, claiming that it prevents the beetles from laying eggs on the trees to some extent, as well as being a value in preventing sun scald. Peach Tree Borer.—Many favorable reports are being received regarding the effectiveness of the paradichlorobenzene treatment. Buffalo Tree Hopper.—Doing considerable damage in young orchards in parts of the Rocky Mountain district. Indications are that miscible sprays kill many eggs. Pear Leaf Blister Mite.—Many growers find it rather difficult to control this pest effectively. Green Apple Aphis.—Tobacco extract, kerosene emulsion, and soap solutions also recommended. The addition of nicotine sulphate to the lime sulphur spray is also recommended. The leaf roller sprays applied late also control this pest. Strawberry Crown Girdler.—Placing straw on the strawberry patch and burning over the patch is also recommended. Bud Moth.—Some recommend 4 to 5 lbs. of arsenate of lead to 50 gal. of water. Apple Leaf Hopper.—When spraying from below with contact sprays, the spray should strike the hoppers. Apple Curculio.—Worse in thick, unpruned and uncultivated orchards. Grasshoppers and Crickets.—White arsenic, 5 lbs. to 100 lbs. of bran, sometimes used, but the sodium arsenite-bran mash is cheaper and is proving very effective. Currant Fruit-fly.—Sweetened arsenate of lead when flies are out is also recommended.		
Current Fruit-fly.	Destroy or renovate neglected bushes; cultivate soil about plants; allow chickens access to currant patch to destroy wormy fruit and larvae.	As fruit develops.			
Green Apple-Aphis.	Pruning infested twigs; tobacco solution, 2 pt. to 100 gal. of water.	Prune in early spring. After eggs hatch and before leaves begin to curl.			
Black Peach Aphis.	Dip nursery stock in strong tobacco solution; spray with concentrated tobacco solution; place tobacco solution or tobacco dust about exposed roots.	When insects first appear on twigs.			
Black Cherry Aphis.	Prune off colony clusters; spray or dip as for black peach-aphis.	Same as for black peach-aphis.			
Strawberry Root Aphis.	Scatter straw over plants in early spring and burn. Destroy the ants which nurture the aphids by carbon bisulphide or poison spray.	Early spring after eggs hatch and plant lice appear.			
Green Peach Aphis.	Tobacco solution, 2 pt. to 100 gal. of water.	Immediately after hatching and before insects migrate to other plants.			
Strawberry Crown Girdler.	Plow under old strawberry patches; rotate crops.	Fall or spring.			
Green Fruit Worm.	Codling moth spray.	When spraying is done for codling moth.			

Insect Pest Control in Southern California

(Continued from page 30.)

scale in different sections requires different dosages to effect a kill, or, when red scale from the different sections are all brought together and fumigated under identical conditions, those of the resistant strain always show a higher percentage coming through alive.

Moulting Period.

Second—The female scale, although having an incomplete metamorphosis and therefore not passing through any pupal stage, still goes through a moulting period in which it casts its skin. During this period it becomes inactive or dormant. Now when an insect becomes inactive all the life processes slow up and while in this condition it becomes quite resistant to fumigation. Therefore the most re-

sistant scale of the resistant strains are those passing through the moult.

Third—Exposure to low temperature for an appreciable length of time causes the insect to become dormant; inactivity results with consequent resistance to fumigation.

Conditions being as they are, it is small wonder that the growers in localities where results from fumigation prove unsatisfactory are turning their attention to spraying. It is not probable that spraying will ever take the place of fumigation even in those sections, but it may be used as supplementary or rather accessory thereto. It is not humanly possible to hit every scale on a heavy foliated citrus tree by means of a spray, and no contact spray will kill what it does not hit. Furthermore, the chances of injury to the fruit and the tree when spray material is used of sufficient strength to kill scale, are very great, and for this reason spraying of citrus trees for control of scale has been discour-

aged. The spray most commonly in use at the present time is a lime-sulphur miscible oil combination—two per cent lime-sulphur, three-fourths to one and one-half per cent miscible oil.

Neutral Miscible Oil Spray Tried Out.

During the past year a neutral miscible oil spray has been quite extensively tried out. This spray, as far as the writer is aware, has caused no injury whatever even when used as high as 10 per cent, unless a slight dropping of the leaves some time after the application can be attributed to it. At strengths above five per cent, it appears to be quite an effective ovicide and for that reason gives promise of usefulness against the red spider, as well as scale, especially in the coastal sections where lime sulphur is ineffective against the former.

An innovation in the fumigation procedure has been brought about the past season by the use of calcium

cyanide dust. This has been applied under the tent by means of a power blower specially adapted to this purpose. The generation and diffusion of hydrocyanic acid gas by this method, and also the scale kill, have been quite satisfactory, but severe injury to the fruit and tree have resulted wherever moist atmospheric conditions have been encountered. The use of this new insecticide for the present, will be restricted to the dry interior sections such as the San Joaquin, Coachella and Imperial valleys. However, its use is not confined to the fumigation of citrus trees; it gives promise of successful employment against the grape leaf hopper, false chinch bug and other insects. The grape leaf hopper succumbs readily to the gas given off and falls to the ground. The insect will revive in a short while unless the soil under the vines is given a thorough coating of dust.

(Concluded on page 36.)

Timeliness In Apple Scab Control

by G. H. Coons
Michigan Agricultural College

OF ALL the plant disease problems which confront the fruit grower, the control of apple scab is probably paramount. But interest in scab and scab control waxes and wanes—some years apple scab is the center of discussion and some years its consideration is taboo. A year ago at a large convention of

a post-mortem on our failures to control the disease, but should be alive and active until growers everywhere intelligently put in practice the abundant information which we now have about this wasteful disease which year in and year out reduces fine fruit to seconds and culls, to say nothing of the wasting effect it has upon the set of fruit and upon leaf efficiency. In short, because apple scab during the past season did relatively small damage in the northeastern fruit section, growers should not beguile themselves into feeling a false security against this parasitic disease. Apple scab is still with us and still is a matter of utmost concern to the grower who would produce quality apples.

Of all the diseases that could be chosen, apple scab is probably best known to the growers in certain of its phases. In other phases it isn't known at all. Yet intelligent control of such a parasite hinges upon a grower's ability to detect the disease in all its ramifications and to utilize the information which the experiment stations through the press give to growers. When the editor of the American Fruit Grower Magazine asked me to write an article on this disease and its control, I welcomed the opportunity to bring before the fruit men who study its pages the fundamental facts about this parasite, which a grower must have in order to control efficiently and thoroughly this blemishing disease.

Scab Must Be Known When Seen.

In the first place, it is necessary to know apple scab when you see it. As I have said, scab on the fruit is well known (Fig. 1). Scab on the leaves

is not so well known. Long experience with growers in the field has shown me that the majority do not know the effect scab produces in its primary stages of attack—the leaf phase. Apple scab on the leaves shows up as a sooty growth on either the upper surface or lower surface of the leaf (Fig. 2). The spot is not so black as is typical for the fruit stage, but is rather a black mold, occupying a circular area from an eighth to a quarter of an inch in diameter. Sometimes the scab is so severe as to blacken the entire under surface of a leaf. With susceptible varieties, the leaves may be puckered or humped at the scab spot. Other susceptible varieties may have dead areas about the spots, but in all cases the telltale sooty growth is present. With some varieties of apple, the scab attacks the twigs, making small dead patches on the bark, much as if small bits of tissue had been scratched up with the finger nail. Fortunately such attacks are rare, the Lady apple being the only one showing such a condition commonly. With pear scab—a sister parasitic disease—the twig scabbing is common and this is what makes pear scab so hard to control.

Then there are the attacks of scab on the pedicels of the young, rapidly expanding fruit. Certain authorities state that in some seasons apple scab is largely responsible for the so-called June drop. At any rate, examination of the fallen fruit reveals scab cankers on the fruit pedicels, which penetrate deeply enough to account for the fall of the fruit.

Winter Fruiting Stage Most Important.

Then there is the winter fruiting

stage of the fungus which inaugurates the disease during the new season. It is a safe proposition that no practical grower knows this stage which is most important in influencing the amount of scab during the season



Fig. 1—Apple scab on fruit.

apple men, control of scab was the theme of many a session. The past year it has hardly been mentioned. The reason for the rise and fall of interest has been the relative presence and absence of the trouble. The 1922 year was a "scab" year and experienced growers fell woefully short of control. The year 1923 was not a scab year and growers have banished scab from their thoughts. Unfortunately, apple scab has not been banished from our orchards. And interest in this disease should not trail along, as



Fig. 2—Apple scab on leaf.

which is to follow. This is produced on the fallen leaves which lie scattered here and there beneath the trees—some partly buried, some in contact with the ground and some blowing about here and there. Examine a leaf at random next spring and on both

(Continued on page 44.)

A Capacity and Price Range to Fit Every Job!

OUR spray pumps are built in capacities to fit every job, and every pocket book as well,—from the small hand sprayer for hedges and rose bushes to the 30 gallon per minute power sprayer for the largest fruit farm.

This wide range of line to choose from is of the utmost importance to the fruit grower.

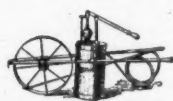
There is no use in tying up capital in a spray outfit that is really larger than needed, nor is there any economy in

tackling a spray job with an inadequate sized rig that means a waste of time and labor,—and leaves results in doubt.

You will find there is a Deming Sprayer that will give you just the capacity and pressure that you need, *with all the features you have wanted, and at an attractive price.*

Deming Power Sprayers Built in 3 Capacities

5 gal. per min. 250 lb. pressure
12 gal. per min. 300 lb. pressure
30 gal. per min. 400 lb. pressure



The "Wheelabout"

A wheelbarrow spray outfit especially designed for the gardener and small fruit grower who wants an easily operated, one-man machine. It has the fewest possible parts, is light in weight, yet substantially constructed for long hard service. The pump develops 100 lb. pressure.



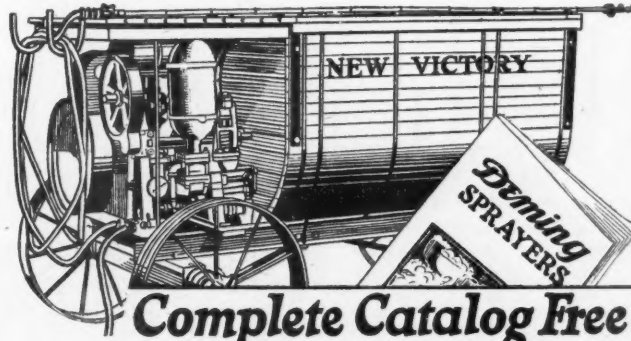
"Century" Barrel Sprayer

The premier of all barrel sprayers. Used for general spraying, disinfecting, white-washing, etc. Rugged, powerful, but easy working pump will supply 2-leads of hose. All working parts brass.



The "Farmer's Friend"

One-Horse Rig Substantial platform and hardwood shafts. 50 Gal. Tank. Powerful Pump will supply 2 leads of hose. Deming 4-Row Spray Boom can be attached for field crop spraying.



Complete Catalog Free

THE DEMING CO., 953 Depot St., Salem, Ohio



Deming
HAND AND POWER PUMPS FOR ALL USES

SPRAY PUMPS

Every Fruit Grower should have our latest Catalog. Send for it.

THE DEMING COMPANY

953 Depot Street, Salem, Ohio

Please send me your complete spray catalog covering hand and power spray outfits.

Name

Post Office

State

Spray Calendar for Pennsylvania.

By F. N. Fagan, Pennsylvania State College

APPLES			PEACHES		
Time.	Materials for 200 Gallons of Spray.	For Following Diseases and Insects.	Time.	Materials for 200 Gallons of Spray.	For Following Diseases and Insects.
TREES DORMANT or DELAYED DORMANT.	Lime-sulphur testing out of sprayer 1.03 Sp. Gr.	San Jose Scale.	DORMANT.	Lime-sulphur to test 1.03 Sp. Gr. out of sprayer.	San Jose Scale, Peach Leaf Curl.
Leaves of first buds showing about 1/4 in.	Lime-sulphur testing out of sprayer 1.03 Sp. Gr. Tobacco Extract (40 per cent nicotine) 1 qt. Powder arsenate of lead 6 lbs.	San Jose, Oyster or Scurfy Scales. Aphis. Bud moth. Leaf-rollers and other eating insects.	*Special DORMANT.	Miscible oil such as "Scalecide." Strength as recommended by the manufacturer.	Lecanium and related scale insects.
Pink. When flower cluster buds are separating.	Lime-sulphur testing out of sprayer 1.008 Sp. Gr. Tobacco Extract (40 per cent nicotine) 1 qt. Powder arsenate of lead 6 lbs.	Apple Scab, Frog-eye, Mildew. Aphis—any early red bug. Bud Moths—Leaf-rollers, Curculio.	When little peaches are pushing out of calyx shucks. Shucks may be dropping.	*Self-boiled Lime-sulphur, 32-32-200.	Peach scab. Brown Rot.
Petal Fall. When petals have nearly all fallen from flowers.	Lime-sulphur testing 1.008 Sp. Gr. Tobacco extract (40 per cent nicotine) 1 qt. Powder arsenate of lead 6 lbs.	Scab, Frog-eye, Mildew. Aphis, Red Bug if not under control. Codling moth, Curculio and any other eating insects.	Three weeks later.	Powder arsenate of lead 6 lbs. Repeat last spray.	Curculio.
Two weeks after Petal Fall. Apples well formed.	Repeat Petal Fall spray.	Apple Scab, Frog-eye, Apple Blotch. Codling Moth, Maggot, Aphis, Red Bug.	Three to four weeks before fruit ripens.	Self-boiled lime-sulphur, 32-32-200.	Peach Scab. Brown Rot. Curculio.
*Extra Spray. For use in sections infested with Apple Blotch and Bitter Rot.	Bordeaux Mixture, 16-16-200. (If eating insects are not under control use 6 lbs. powder arsenate of lead.)	Blotch and Bitter rot.	*Dry-mix Sulphur Lime may be substituted for self-boiled—2 lbs. calcium caseinate, 16 lbs. hydrated lime, 32 lbs. superfine sulphur. Mix dry before placing in 200-gal. sprayer.		
Four weeks after Petal Fall spray.	(If Aphis not under control use nicotine in this spray same as in Petal Fall spray.)	Codling moth.	PEARS		
Mid-Summer Spray. Late July or early August, depending upon season. Time it for second broad codling moth.	Repeat Petal Fall spray. Nicotine not necessary unless aphids are not under control. Substitute Bordeaux Mixture for the Lime-sulphur in sections where Blotch and Bitter Rot are found as pests.	Late infection scab—Fruit spot—Sooty and Fly speck fungus—Bitter rot. Codling moth and other eating insects.	DORMANT.	Lime-sulphur testing 1.03 Sp. Gr.	San Jose Scale.
In sections where Lime-sulphur solution burns foliage and fruit Self-boiled Lime-sulphur can be substituted.			Pink or Flower bud.	Lime-sulphur to test 1.008 Sp. Gr.	Scab, Leaf Spot, Black Spot, Black Rot.
CHERRIES			When flower buds separate in cluster.	Tobacco extract (40 per cent Nicotine) 1 qt. Powder arsenate of lead 6 lbs.	Psylla, Aphis. Any eating insects.
DORMANT.	Lime-sulphur to test 1.03 Sp. Gr. out of sprayer.	San Jose, Forbes, Putnam scales.	Petal Fall.	Lime-sulphur to test 1.008 Sp. Gr.	Scab, Leaf Spot, Black Spot, Black Rot.
*Extra spray. When first new leaves show aphids present.	Miscible oil sprays as recommended by the manufacturer.	Lecanium and related scales.	After petals have fallen.	Tobacco extract (40 per cent Nicotine) 1 qt. Powder arsenate of lead 6 lbs.	Psylla, Aphis. Codling Moth, early slugs.
Petal Fall. After petals have fallen.	Self-boiled Lime-sulphur 32-32-200. Powder arsenate of lead 6 lbs.	Brown rot, Leaf Spot, Mildew, Curculio.	Fruit Cluster spray about 2 weeks after petal fall. When young fruits stand in open cluster.	Lime-sulphur to test 1.008 Sp. Gr. Powder arsenate of lead 6 lbs.	Scab, Leaf Spot, Black Spot, Black Rot. Codling Moth, slugs.
When calyx shucks are off the green fruit.	Self-boiled Lime-sulphur, 32-32-200. Powder arsenate of lead, 6 lbs.	Brown rot, Leaf Spot, Mildew, Curculio.	Special Sprays Needed to Fight Pear Psylla. Nicotine 1 qt. to 200 gal. and 4 to 6 lbs. of soap in summer months to kill nymphs. Miscible oil sprays as recommended by manufacturers on warm days in late winter will aid by killing adults.		
*Just before fruit turns color.	Self-boiled Lime-sulphur. Powder arsenate of lead, 6 lbs.	Brown rot, Leaf Spot, Mildew. Fruit fly, early slugs.	PLUMS		
Late summer foliage spray.	Self-boiled Lime-sulphur. Powder arsenate of lead, 6 lbs.	Leaf Spot.	DORMANT.	Lime-sulphur to test 1.03 Sp. Gr. out of sprayer.	San Jose Scale.
After fruit is harvested.	Powder arsenate of lead, 6 lbs.	Cherry Leaf slug.	When little plums are pushing out of calyx shucks. Shucks may be dropping.	Miscible oil sprays as recommended by the manufacturer.	Lecanium and related scales.
*This spray may often be omitted.			Two weeks later.	Self-boiled lime-sulphur, 32-32-200. Powder arsenate of lead 6 lbs.	Brown Rot, Leaf Spot, Mildew, Curculio.
GRAPES			Fruit Spray. Two to three weeks before harvest.	Self-boiled lime-sulphur.	Leaf Spot, Brown Rot, Mildew, Curculio.
When new shoots are 6 to 14 in. long.	Bordeaux Mixture, 16-16-200.	Mildew. Anthracnose. Black Rot.	*Bordeaux mixture 16-16-200 can be used in place of self-boiled lime-sulphur on European varieties. Self-boiled lime-sulphur is more safe on Japanese varieties.		
Before flower buds open, but after flower bud clusters are well formed.	Powder arsenate of lead 6 lbs.*	Flea beetles—early Rose chafer and Berry moth.	SPRAY CALENDAR		
Just after flower buds have bloomed and young fruit has set.	Bordeaux Mixture, 16-16-200. Powder arsenate of lead 6 lbs.	Mildews. Anthracnose. Black Rot. Flea beetles, Root worm, Rose chafer, Berry moth.	1. To secure the specific gravity of lime-sulphur as recommended in this calendar, test the concentrated lime-sulphur solution with a specific gravity hydrometer. Divide the decimal part of the concentrate reading by the decimal of the desired spray. The result shows the total dilution required. Example, concentrate testing 1.27 sp. gr. and desired spray is 1.03 sp. gr., dividing .27 by .03 gives 9. Nine is the total dilution required; thus one would use 1 gal. of a concentrate testing 1.27 sp. gr. and 8 gal. of water to get a spray testing 1.03 sp. gr.		
Ten days to 2 weeks later.	Bordeaux Mixture, 16-16-200. Powder arsenate of lead 6 lbs. (If any leaf hoppers are present in nymph stage add 1 qt. of 40 per cent Nicotine.)	Mildews. Black Rot. Any eating insects.	2. Know what pests you are trying to control.		
Two weeks later.	Bordeaux Mixture, 16-16-200. (If eating insects not under control add powder arsenate of lead 6 lbs.) (If leaf hopper nymphs are present add 1 qt. of 40 per cent Nicotine.)	Rots. Mildews.	3. Know you are using the right materials, applying them at the right time and doing a complete job of spraying.		
*Special Leaf Hopper Spray—This insect often becomes a serious pest. It can be controlled by spraying when the hoppers are in the nymph stage by using 1 qt. of 40 per cent nicotine in combination with the above sprays, or by special sprays using the nicotine with 4 to 6 lbs. of soap in solution.			4. Be sure your sprayer engine has power enough to give you good pressure. Two hundred and fifty pounds is not too much pressure if using spray gun, more will do no harm.		

Subscribe to the American Fruit Grower Magazine.

Maloney's
FRUIT and ORNAMENTAL TREES

For Both Home and Commercial Planting

all the choicest varieties grown in our own upland Nurseries, the largest in New York State, and offered to you at growers' prices—For 40 years we have been building up our big Nursery business by delivering only the best quality stock, grown, dug and shipped under our personal supervision.

We know the varieties sent you are just what you order and guarantee them to be absolutely healthy and vigorous—We sell direct from our 400-acre Nursery at cost of production plus one profit. That's why Maloney customers get better trees at such exceptionally low prices.

This Spring we have a fine assortment and can give you what you want. Send today for our Free Descriptive Catalog, and place your order early.

We will send you exactly what you order and charge you an absolutely fair price.

We Prepay Transportation Charges (see Catalog)

MALONEY BROS. NURSERY CO., Inc., 27 Main St., Dansville, N. Y.
Dansville's Pioneer Nurseries

Send for this Free Book

We're responsible. Look up our rating.

30 VARIETIES STRAWBERRY PLANTS Northern Grow
Dunlap, Dr. Burrill, \$2.50, 1000. Gibson, \$3.50.
Raspberries, Grapes, Ornamental Shrubs, Fruit Trees, etc. None better anywhere. Catalog.
RIGER'S NURSERY, SAWYER, MICH.

CHAMPION EVERBEARING STRAWBERRY plants \$10.00 per 1000 strong well rooted plants.
Also COOPER, EATON, HUN SPECIAL strawberry plants. Prices reduced. The new ALFRED blackberry berries 1 1/2 in. long, bears heavy, largest known. Write for FREE catalog telling all about this wonderful blackberry.
South Michigan Nursery, George Stramer, New Salford, Mich., U.S.A.

Grow KEITH'S STRAWBERRIES

ALL for big crops and big profits. There is big money in growing strawberries when strong, healthy, large-rooted plants are set. Our plants are grown on new land near the Lake shore in fresh virgin soil, filled with nature's plant foods, making them big, deep-rooted, full of life and vigor, just the best that Nature can do where conditions are ideal. Some of our customers last year made from

\$500 to \$700 Per Acre

growing strawberries from Keith's new-land plants. We guarantee our plants to be strong, healthy, true to name and to give entire satisfaction or we refund your money. No better plants are grown anywhere. They are certainly the best you can buy and they are guaranteed to reach you in good growing condition. We ship them well packed, direct from our Nursery. We supply you with a free copy of Keith's Ways to Successful Berry Culture with your first order. We have a splendid stock of Keith's Everbearing strawberry plants, as well as the well-known standard varieties, also grapes, raspberries, blackberries and other small fruits, all illustrated and plainly described in our handsome new catalog which is now ready for you. It is full of valuable information. Illustrating growing fields and fruits.

Write for it before placing your order. We advise you to let us have your order as quickly as possible so that you may be sure of just the kind you want. It's FREE, send today, receive it tomorrow.

KEITH BROTHERS NURSERY, BOX 903, SAWYER, MICHIGAN



ARMSTRONG STANDARD SPRAY PUMP

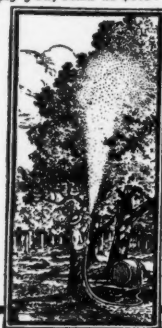
The Pump of a Hundred Uses

"The best pump you can buy"

DEALERS say this for they know that the Armstrong Spray Pump is the best for its many uses and long life. While the important use is spraying fruit trees and truck crops, yet it is as efficient for applying cattle dip, fly and vermin spray, whitewashing, cleaning motor cars, etc., and as a Veterinary Injector. Sprays the tallest trees from the ground. Brass construction throughout. Not affected by chemicals. Five year guarantee.

If your dealer cannot supply you, send us \$5.50 and his name (\$6.00 in the far west). Knapsack extra. Send for catalog D.

The Armstrong Mfg. Co.
329 Seventh Avenue
Huntington, W. Va.



Get Low Prices on Berry Boxes and Baskets

Write for our Free Catalog! Shows you how you can save money by buying direct from the Inland Berry Box and Basket Factory in the Country.

New Albany Box & Basket Co., Box 102 New Albany, Ind.

16¢ a rod WIRE FENCE

Best for ornamental fence
bargains. Save money on every rod. Sold direct from our factories to you at prices that will amaze you. Satisfaction Guaranteed or your money back. Many styles of fence, wire and posts. Write today for FREE Fence Book.

OTTAWA MANUFACTURING CO.
Fence makers for over 30 years
Box 421-B, Ottawa, Kan. Chicago Heights, Ill.
Pittsburgh, Pa., Ft. Worth, Tex., Oakland, Calif.,
Los Angeles, Calif., Portland, Ore. Write nearest address.

Green's Trees Shrubs, Vines



For over 45 years thousands of growers have bought direct from Green's nurseries. They have saved money and obtained strong, healthy, hardy Northern grown, full-rooted stock, true-to-name. Thru them, Green has built a wonderful reputation for fair dealing.

Apple, peach, pear, plum, quince, cherry, nut trees; grape and ornamental vines; gooseberry, currant, raspberry, blackberry and rose bushes; strawberry plants, all grown in our own nurseries. Offered direct to you at money-saving prices and guaranteed true-to-name.

Green's Money Saving 64-Page Catalog

is a textbook of useful, practical information on fruit culture and the care of plants and vines. It lists and describes only best growing and bearing varieties. With catalog we send FREE booklet, "How I Made the Old Farm Pay." Write today.

GREEN'S NURSERY CO.
1423 Green St., Rochester, N.Y.

from NURSERY to You

Citrus Insects and Diseases

(Continued from page 16.)

been tried. An early and still often used one in small areas is to gather leaves or twigs having fungi on them and fasten these close against leaves or twigs of infested trees. The most used means now is to soak leaves well covered with fungi in a fruiting condition in water, stirring well so that spores and pieces of filaments



Red-headed fungus on purple scale attacking citrus leaf.

may be washed off, then spraying this water into the trees. The best time for doing this is during the rainy season, and a mixture of two or more kinds is desirable.

Keeping in Cold Storage.

The fungi are usually gathered from the trees when needed, but if large quantities are wanted it is sometimes difficult to find, for when most of the larvae are killed or when the weather is dry much of it dies. It has been found that leaves with the attached fungus may be gathered in autumn and kept in cold storage till the time for spraying comes again. They may be dried and kept also, though the spores do not always retain their vitality when treated this way.

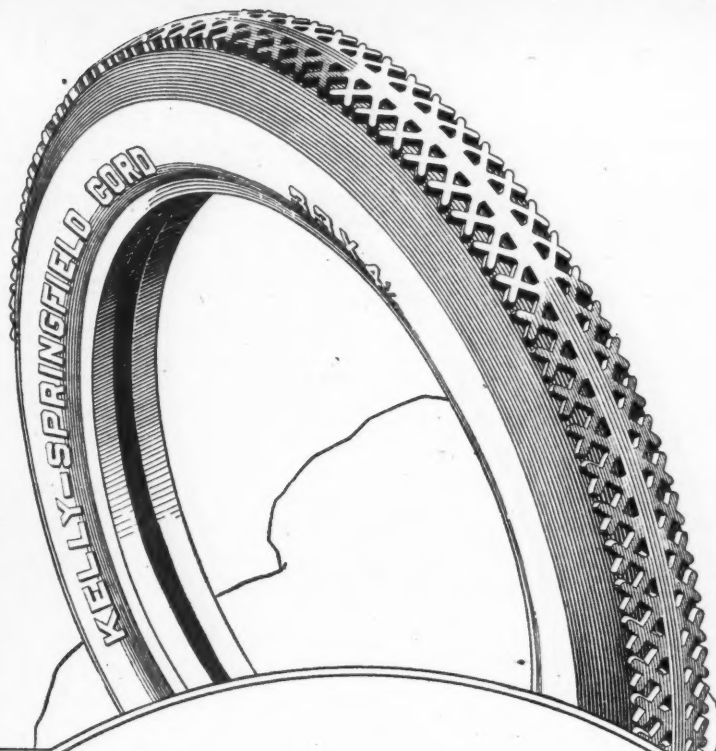
Growing on Sweet Potatoes.

The Red Fungus grows well, under proper conditions, on sweet potatoes. One who has but a small amount may, by starting six or eight weeks before the fungus is needed, grow a good supply by cutting potatoes, putting pieces in large mouthed bottles, sterilizing them, and then inoculating with fungal spores and keeping them at an even favorable temperature till development is complete.

A number of men make a business of spraying on fungi during the summer. One man during a recent season sprayed 100,000 trees, or approximately 1400 acres. Several others sprayed 15,000 to 25,000 trees. Altogether, within the past few years, over 2,000,000 trees have been treated each year.

It is not wise to trust entirely to the working of the fungous friends to keep their host insects in subjection. Oil emulsion sprays from the lubricating oils first came into general use in Florida on white fly and scale insects. These are still much used and when properly applied are very efficient. Recently there has come into use a combination of these with Bordeaux mixture, which is proving of much value. Its development came about as a result of a need for a preparation that would be both a fungicide and an insecticide. When Bordeaux is applied to control a fungous disease, it destroys the beneficial fungi as

(Continued on page 42.)



Buy tires as you buy livestock

All horses have four legs. All tires are made up of rubber and layers of cotton cord or fabric.

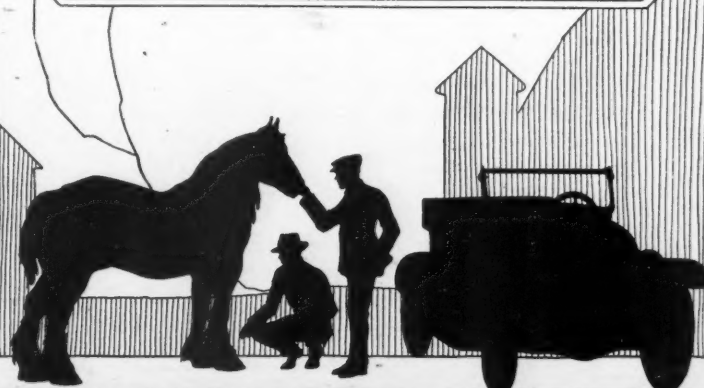
But all horses are not equally valuable—and neither are all tires.

A horse of good blood and breeding is naturally worth more than a "plug." If you were offered your choice at the same price there isn't any doubt which one you would take.

Why not buy tires with the same sound judgment?

For a quarter of a century Kelly-Springfield tires have been recognized as the "blooded stock" of the tire world. The Kelly tires of today are the best we have ever made, yet now, because of greatly increased production in our huge new plant,

It costs no more to buy a Kelly



KELLY SPRINGFIELD TIRES

Spray Calendar for Southern California

By Hugh Knight, Citrus Experiment Station

The important diseases and pests that affect commercially grown trees

APPLES				PEACHES			
What to Spray For.	Treatment.	When to Spray.	Remarks.	What to Spray For.	Treatment.	When to Spray.	Remarks.
Codling Moth.	6 lb. dry basic arsenate of lead to 200 gal.	(1) When most of petals have fallen. (2) Just after blossoms fall. (3) 8 to 10 weeks later.	Thoroughness is the essence of codling moth spraying.	Scales—Black and Brown.	Miscible oil or crude oil emulsion.	Dormant season.	Not generally severe on peaches.
Woolly Aphis. Green Aphis. Peach Aphis.	Nicotine sulphate and liquid whale oil soap or miscible oil.	As soon as aphis appear in spring.		Peach Leaf Curl. Twig Borer.	Lime-sulphur sol.	When buds commence to swell.	Dormant spray for blight may be enough.
San Jose Scale.	Lime sulphur 10-12 gal. to 100 gal. or 2% lubricating oil emulsion.	Dormant season.		Calif. Peach Blight.	Bordeaux.	Dormant season.	
Apple Scab.	Bordeaux.	As soon as cluster buds open.		PEARS			
Powdery Mildew.	Lime-sulphur sol. or atomic sulphur.	In spring.	Combine with (2) Codling Moth spray.	Thrips.	Nicotine.	As the blossom buds are opening.	
APRICOTS				Red Spider (mites).	Lime-sulphur sol. or atomic sulphur.	When mites appear.	Often dormant oil spray will control mites.
Brown Apricot Scale.	Miscible oil or oil emulsion.	Dormant season.		Codling Moth.	See under "Apple."		
Black Scale.	Bordeaux.	Early fall.	Before heavy rains.	Pear Blight.	Spraying not effective.		
Shot Hole Fungus (Calif. Peach Blight).	Bordeaux.	Early fall.		PRUNES			
Brown Rot.	Bordeaux.	Early fall.		Brown Apricot Scale.	Miscible oil or crude oil emulsion.	Dormant season.	
ALMONDS				Mealy Plum Louse.	Nicotine.	Just after petals have fallen.	The oil spray for scale may control aphis if applied just after harvest or just before blossoming.
Red Spiders (mites).	Lime-sulphur sol. or atomic sulphur, or dry lime-sulphur.	Dormant season. Late spring.	Generally successful.	Red Spider (mites).	Lime-sulphur dust, lime sulphur solution or atomic sulphur.	Whenever mites appear.	
Shot Hole Fungus (Calif. Peach Blight).	Bordeaux.	Early fall.	A "second bet" when needed.	WALNUTS			
GRAPES				Codling Moth.	Spray 4 lbs. dry basic arsenate of lead to 100 gal., or dust with 15 per cent arsenate lead dust.	May 25 to June 20. When hatch is well under way.	When both codling moth and aphis are present, add 1 pt. nicotine.
Leaf Hopper.	Dust with 8-10 per cent nico-dust (3-4 per cent nicotine) or spray with nicotine whale oil soap solution.	May to July. During nymphal stage.		Aphis (when codling moth is not present).	Nico-dust.	May or June.	
Mildew.	Dust with flowers of sulphur.	(1) When shoots are 8 to 10 in. (2) When fruit is size of buckshot.		Red Spider (mites).	Flowers of sulphur and hydrated lime 3 to 1.	When mites appear.	
Mealy Bug.			Not usually treated for in southern California.	SMALL FRUITS			
CITRUS FRUITS (Oranges, Lemons, Pomeles).				Mildew.	Flowers of sulphur dust.	Early in spring.	
Scales—Black, Citricola.	Fumigation generally recommended over spraying. Several proprietary miscible oils are occasionally used.			Strawberry Leaf Spot.	Bordeaux.	Just before or just after blossoming.	
Red and Yellow. Purple.	Time of treatment—June to January. All year.			Aphis.	Nicotine.	Whenever they appear.	
Mealy Bug.	Now controlled almost entirely by natural enemies. Argentine ants must be kept away from trees if natural enemies are to do their work properly.			Red Spider (mites).	Sulphur.	Whenever they appear.	
Red Spider (mites).	Lime-sulphur sol. or Atomic sulphur dust.	Whenever mites appear.	Natural enemies are now generally efficient near the coast.	<p>Peach twig borers attack many of the deciduous trees occasionally. Special spraying for them is seldom practiced. Dormant oil spraying seems to be beneficial in their control.</p> <p>California peach tree borer may be controlled by use of paradichlorobenzene applied to soil during warm weather.</p> <p>There is a tortrix worm that occasionally does some damage to oranges, but special control measures are not employed.</p> <p>Woolly aphis attacks both apples and pears, and occasionally other deciduous trees. The aerial forms may be controlled as are other aphis, but the root forms are much more difficult to combat. There is no proven economical method of control on old trees.</p>			
Thrips.	Lime-sulphur and nicotine sulphate.	Blossoming time.	May sometimes be combined with red spider control. Required only in interior.	Strength of Materials to Use			
Brown Rot.	Bordeaux.	Fall or early winter.	Usually required only on lower branches of lemons.	<p>Nicotine— 1 pint to 200-gal. tank. Three gallons of liquid soap is an aid as a spreader.</p> <p>Miscible Oil— Several proprietary preparations for which the formulas vary.</p> <p>Crude Oil Emulsion— Crude oil (21-24)..... 25 gal. Liquid soap 3 gal. Water 175 gal.</p>			
OLIVES				<p>Bordeaux— For fall or dormant deciduous spraying, 5-5-50 or Bordeaux powder, 18-20 lbs. to 200-gal. tank. For spring deciduous or any citrus spraying, 2-2-50 or Bordeaux powder 8-12 lbs. to 200-gal. tank.</p> <p>Lime Sulphur Solution— 20 gal. to 200 gal. tank for all purposes listed except on citrus during warm weather, reduce to 6 gal. Casein has proven a very efficient spreader. Use at rate of 1½ lbs. to tank (200 gal.) with any of the sprays recommended.</p> <p>Atomic Sulphur— 20 lbs. to 200-gal. tank for all purposes listed.</p>			
Black Scale.	Miscible oil.	As early in winter as fruit is off the trees.	Olives will not stand full strength of dormant oil sprays.				

Insect Pest Control in Southern California

(Continued from page 32.)

Citrophilus Mealy Bug.

The biological method of pest control has received added impetus the past year mainly on account of the rapid spread of the citrophilus mealy bug (*Pseudococcus gahani*) throughout the citrus growing sections. It is now found in every citrus county in Southern California with the exception of San Diego and Imperial.

Neither fumigation nor spraying have proven an effective means of control against this pest, consequently the fight against it centers around the quantity production and liberation of its natural enemies. Unfortunately the internal parasite (*Leptomastidea abnormis* Girault) which plays so important a part in the control of the

citrus mealy bug (*Pseudococcus citri*) does not attack the citrophilus mealy bug, therefore reliance must be placed on its predatory enemies, principal among which is the ladybird beetle, *Cryptolaemus montrouzieri*.

Insectaries have been established in every county of Southern California except Imperial, from which a supply of these beetles as well as other predators may be obtained.

The first step in the fight against the mealy bug is to exterminate the Argentine ant if present. This ant protects the insects from their natural enemies and as long as they are present, not much headway can be made against the mealy bug.

Control of Argentine Ant.

The Argentine ant is readily and effectively controlled by means of a poisoned syrup made according to the "Government formula," United States

Department of Agriculture. This is placed in suitable containers, usually small spice cans dipped in paraffin to prevent rusting, with a hole punched in one side near the top. They are then distributed throughout the grove, the cans being hung on small nails driven into the trunks of the trees above the ground.

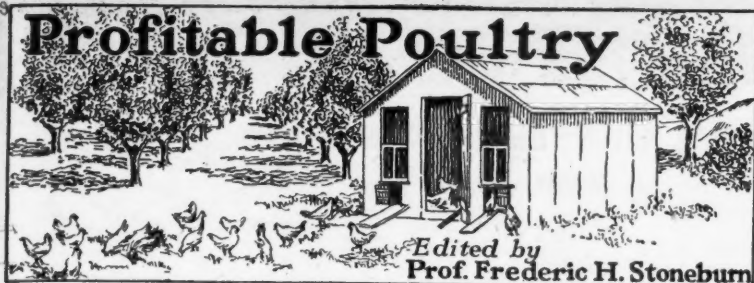
The next step is to band the trees with burlap, the bands being placed around the trunk below the crotch. These bands provide protection to the adult mealy bugs, which congregate therein in great masses during the egg-laying period. They also provide ideal conditions for the establishment and propagation of the predatory beetles, the larvae of which feed on the mealy bug in all stages, as the rapidly with which a colony will establish itself and become effective depends mainly upon the amount and availability of the food supply.

It is confidently expected that by breeding these beetles in large quantities and liberating them in infested groves, the fight against the citrophilus mealy bug will be won and that it will be reduced to the same status as its near relative, the citrus mealy bug, which is kept in subjection satisfactorily by the biological method.

Lemons by Water

CARLOADS of lemons are being shipped from San Pedro, Calif., to New York by boat by way of the Panama Canal. The trip takes 15 days and the fruit is arriving in very good condition. It is believed in a relatively short time the tonnage to be shipped this way will be greatly increased.

Profitable Poultry



The Spring Chicken Crop

IN THE preceding issue of this publication, certain reasons were presented to show that fruit growers are in especially favorable position to profitably keep poultry on a commercial scale; not merely keep a few birds for the production of the eggs and chickens required to supply the family table, but a flock of sufficient size to produce a very considerable income.

That means anywhere from 300 to 1000 layers, in short, a real poultry department of such importance as to warrant the investment of sufficient capital to properly equip the plant and the attention of one or more capable people who will assume full responsibility for the enterprise. The effort should be to maintain as many birds as can be handled without interfering with the leading crop, and that is a matter of judgment and experience. Each fruit grower must decide this question for himself. Those who are entering the poultry field seriously for the first time, who have not previously kept fowls on a commercial basis, may well make the experiment on a restricted scale with, say, about 100 layers the first winter. Expansion can then be made as experience is gained and results justify. The majority will quite naturally specialize in the production of eggs, though some may prefer to take up the growing of choice table poultry, a specialty which is very promising at this time. The following remarks are addressed primarily to the egg farmer.

As early-hatched pullets are the most dependable layers of winter eggs, and as eggs produced during the cold season bring the highest prices, one naturally will endeavor to grow the required number of pullets each year to make up the greater part of the laying flock. This is the universal custom among specialists in this field. This is, perhaps, the most trying and important work of the poultryman's year. Any mistakes in the mating and rearing of the chicks, will show up when the flock is in laying quarters and due to shell out the eggs. Then it is too late to correct the errors and a year is lost. Hence the thoughtful grower of poultry will carefully consider the various factors involved, plan his work in advance and provide everything required to enable him to work his plan. He will have things ready, will not be compelled to resort to last-minute make-shifts, with consequent unnecessary trouble and loss.

Keep nothing but standard-bred, uniform birds, preferably all of one breed and variety. Mixed flocks are not usually satisfactory; scrubs or mongrels are unworthy of attention. And, if possible, use birds of a bred-to-lay strain and so get immediate benefit of the years of work on the part of some careful breeder. Such stock costs more but it is worth heaps more, not only to the present generation but the many generations which follow.

There are many good breeds—many good hens in all breeds. There is no one breed which is best for all purposes and under all conditions. At the risk of offending certain fanciers, I will state my conviction that the most popular of the white-egg producers is the Single-Comb White Leghorn, and of the general purpose, brown-egg breeds the leaders are the Plymouth Rock, Rhode Island Red and Wyandotte.

If your present stock is not the right

breed or the right quality, do not breed it this year. Buy your chicks ready made (baby chicks) from some dependable hatchery which offers the breed and quality of youngsters you require. You can thus secure, at reasonable prices, exactly the kind and number of chicks you need and at the time you want them. This is at once a simple and satisfactory way of solving the problem of chick supply.

Arrange to hatch your chicks, or have them delivered, at suitable dates. To make dependable fall and winter layers, the Rocks, Reds and Dottes should be hatched in March and April, the Leghorns in April and May. As such chicks are in heavy demand, chick buyers will do well to place their orders early to avoid disappointment. If you plan to buy chicks, order them soon. If you will hatch them, mate up the breeding flocks and get the incubators in shape for service.

If equipment permits, it is generally best to raise all the pullets at the same time. As adult birds they will then all be of the same age. If you use the same equipment to rear two lots of chicks the same season, there must be six to eight weeks' difference in their ages. In my opinion, the best plan for a plant of moderate size is to have enough equipment to permit the growing of the desired number of pullets without having too great a difference in their ages.

Do not make the mistake of rearing too few chicks. Better to have more pullets than you need, and sell the surplus, than to be compelled to buy the additional number required to fill up the laying pens when the fall round-up discloses a shortage of potential dollar-producers. Provide about three times the number of chicks as the required number of pullets. This will allow for average mortality, for 50 per cent cockerels and a number of cull pullets to be discarded. Expert rearers of chicks can accomplish this with a less number of chicks at the start, others may require even more; but the three-for-one basis is safe under average conditions.

In order to grow any large quantity of chicks, it is necessary to resort to artificial methods of brooding. Mother hens are all right, as far as they go, but a busy man can scarcely afford to fuss with a hundred hens (even if he can find them!) with 15 chicks each, when three brooders will care for the entire 1500 chicks with a minimum of labor and annoyance.

Of all brooding equipment, the modern colony brooder is the most satisfactory and efficient. These big self-regulating machines will brood from 300 to 1000 chicks each, depending upon their size and the skill and experience of the attendant. A flock of not more than 300 chicks is most satisfactory for the average operator. Colony brooders burn coal, oil and gas. Personally, I prefer the coal-burning type and this seems to be most popular generally. These dependable machines are not expensive to buy or operate, they save time and labor. And they do grow mighty good chickens. For those who will brood few chicks, a hundred or so, the compact lamp-heated hovers will prove satisfactory. There are many good brooders of this type on the market.

When using the large colony brooders, the common practice is to place each machine in a roomy pen or, bet-

(Concluded on page 43.)

12 Apple Trees
Standard Varieties,
Guaranteed Trees
4ft. average
Easily worth \$10.
Special price
\$3.15

CATALOG FREE

WONDERFUL BARGAINS
In Trees, Fruits, Shrubs, Plants

Prices way down now—mine are lowest because my plan of selling direct from nursery to you ELIMINATES ALL WASTE, ALL EXTRA EXPENSE. NO COMMISSIONS TO PAY, NO TRAVELING EXPENSE. Being the actual grower on a large scale in my 400-acre nursery, my prices are based on large volume, small profit. This means biggest values, BIGGEST GUARANTEED QUALITY that your money ever bought from anyone, anywhere, anytime.

IMOGENE Wonderful New Raspberry
Biggest Grown

IMOGENE RASPBERRY
FREE To Customers

The biggest grown—VERY JUICY, DELICIOUS FLAVOR—will be the pride of the neighborhood where ever grown—only a small supply of these plants available—and these I WILL DISTRIBUTE AMONG MY CUSTOMERS FREE of charge on a special proposition. Write today for full particulars. Try one of these wonderful propositions.

Rosebushes Given Away
To advertise FERRIS QUALITY—to make NEW CUSTOMERS—new friends—to prove that I GIVE BIGGEST VALUES for the money—I will give all my early customers ROSEBUSHES FREE. Write today and get my big special offer.

Improve Your Lot
A few dollars spent right now for the right assortments WILL DO WONDS IN LANDSCAPING and improving your lot, will add hundreds of dollars to values, to say nothing of the beauty and charm created by the various colors embodied in shrubs, plants and ornamentals.

31 Shrubs \$7.00
Picture above contains 17
Barberry (Jap.), 1
Crimson Rambler Rose, 10
Houttey, 3
Spiraea Van Houttey, 3
Spiraea Anthony Waters—a collection that would cost three times what I ask anywhere else. My special advertising, get acquainted offer makes this a real bargain for \$7.00. Other bargain landscape collections and pictures in catalog.

EVERGREENS
Millions of them waiting for you in our nursery, every size, any variety, from tiny dwarfed plants, a few of which should be set out on every lot, to the wind-break varieties which should shelter every farm home to HAVE FUEL and protect live stock against winter's chilly blasts, through heavy snows. My evergreens are hardy northern varieties with highly developed root systems and are all sold under my iron-clad guarantee. Hanging in price from \$2.50 per 100 up.

BARGAINS

When I say my prices are lowest I mean it. My customers are sure of it, and to convince you I list below a few of the many bargains contained in my catalog—Don't miss this great opportunity.

Strawberries, choice 3 varieties	100 for \$1
Ferris Progressive Everbearing Strawberries	50 for \$1
Red or Black Raspberries, choice 2 best varieties	20 for \$1
Concord Grapes one year	12 for \$1
Rosebushes, choice of three varieties	8 for \$1
Bridal Wreath (Spiraea Van Houttey)	8 for \$1
Irish, the old-time garden favorite	8 for \$1
Snowberry one year size	8 for \$1
Indian Currant, one year size	8 for \$1
Roses, choice of seven varieties	8 for \$1
Assorted Philox	4 for \$1
Golden Glow	8 for \$1
Gladiolus Bulbs, assorted varieties	25 for \$1
Asparagus	25 for \$1

Your choice of any 6 of the above Bargains, \$5

BIG CATALOG FREE
The best catalog I have ever published, in fact the best I have ever seen. Beautifully illustrated, showing FRUITS, SHRUBS, EVERGREENS IN ACTUAL COLORS, True to Life. Write for catalog today. It's free, interesting and instructive.

EARL FERRIS NURSERY CO.
465 Bridge St. Hampton, Iowa

Order Your Fruit Trees
From "Nurserymen - Orchardists"

Last season we harvested from our own commercial orchards one of the largest and most profitable crops in 38 years. We have ready for Spring shipment tens of thousands of thrifty young trees, budded from selected bearing trees in our vast commercial orchards. Healthy, well-rooted and true to name. We concentrate on the great money-making varieties—Carnian, Hilley, Belle of Georgia, Elberta, Ray and Brackett.

Each of these is fully described and pictured in our 72-page book, "Nurserymen-Orchardists," also other commercial varieties of Peaches, Apples, Pears, Plums and Cherries. Nor do we neglect the Small Fruits which are so often big money makers, bringing quick returns. The Apple Chart shows at a glance the season, quality and range of the leading varieties. Other pointers are of value, even to experienced growers. This thick, interesting book is yours for the asking. Write today. Get our direct-to-the-planter prices before placing your planting order.

Harrison's Nurseries
Box 52, Berlin, Maryland
"The Largest Growers of Fruit Trees in the World"

EVERLAY BROWN LEGHORNS
The beautiful business best! Wonderful winter layers. Big white eggs. World Record layers American Egg Contest! Greatest winners New York, Chicago. Hardy, vigorous money makers. Stock Eggs, Chicks, shipped safely. Catalog free.

EVERLAY FARM Box 25 Portland, Ind.

BABY CHICKS Postpaid to you. 100% live arrival. Purebred Barred Rocks, Reds, Anconas, 25-44, 50-58; 100-115. White or Brown Leghorns, 50-57; 100-113; 500-560. Etc. Ten other breeds. Catalog free. Bank reference. Booth Farms, Box 520, Clinton, Mo.

QUALITY Chicks & Eggs
45,000 PURE BRED BREEDERS. 15 varieties. Best laying strains. Incubate 25,000 eggs daily. Catalog Free. Prewar prices. Free live delivery.

Missouri Poultry Farms, Columbia, Mo.

PURE-BRED POULTRY Most Profitable varieties. Also EGGS and BABY CHICKS. Incubators, Brooders, Grain Sprouters, Supplies, Garden Seeds. Highest quality. Low cost prices. Illustrated Catalog mailed FREE. Address: **Nichols' Poultry Farm, Box 51, Monmouth, Illinois**

HAYES BROS HATCHERY

BABY CHICKS PREPAID TO YOU 100 PER CENT ALIVE Hatched From Vigorous, Heavy-Laying, Pure Bred Flocks

Prices on	50	100	500	1000
S. C. W. & Brown Leghorns, Anconas	\$7.50	\$14.00	\$67.50	\$130
Barred Rocks, S. C. Reds	8.50	16.00	77.50	150
Wh. Rocks, Buff Orpingtons, Wh. Wyandottes, R. C. Reds	9.00	17.00	82.50	160
Buff Rocks, Wh. Orpingtons, Blk. Minorcas, Black Langshans, Light Brahmas	9.50	18.00	87.50	170
Assorted, Heavy Breeds	7.00	13.00	62.50	120
Assorted, all breeds mixed	5.50	10.00	47.50	90

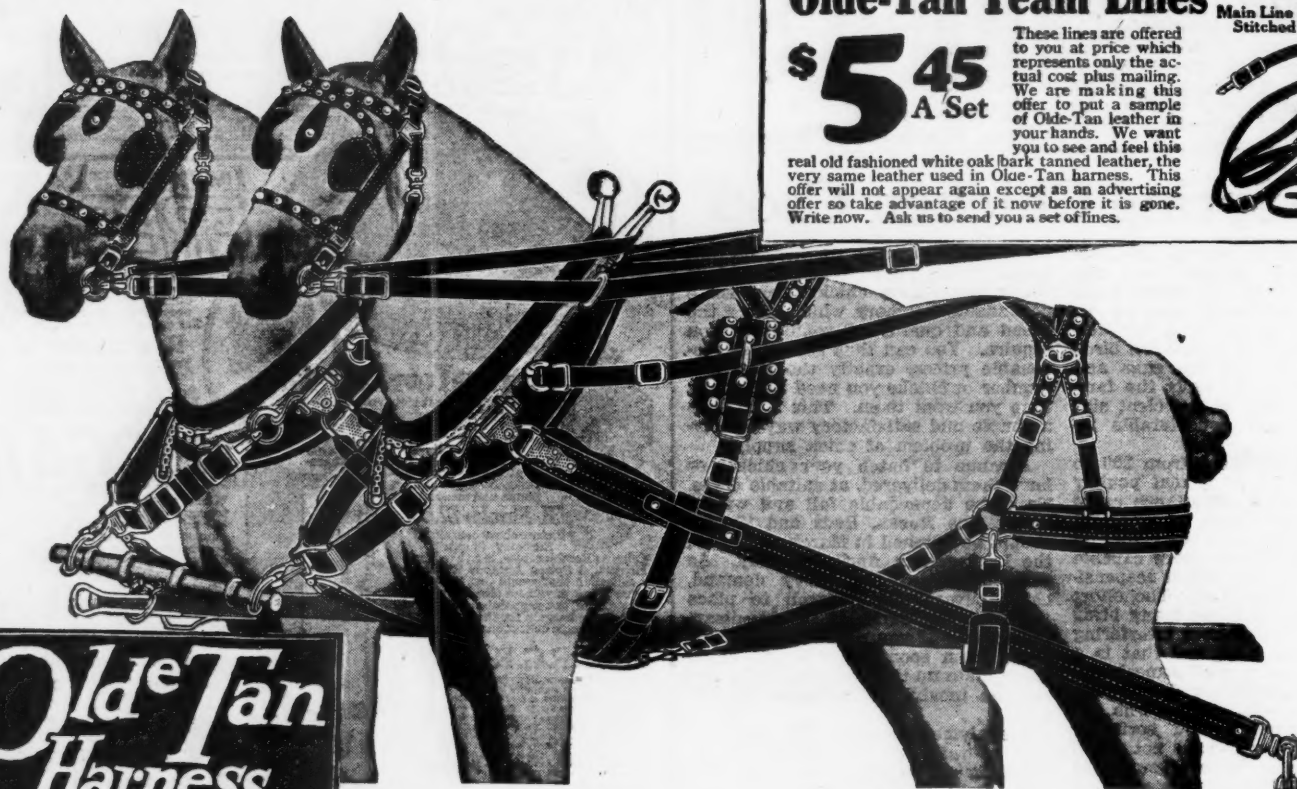
Get our free catalog. Reference: **MILKIN National Bank**. Order right from this adv. Save time. **HAYES BROS. HATCHERY, Box N-5, DECATUR, ILL.**

REILING'S HIGH GRADE CHICKS

REILING'S HIGH GRADE CHICKS
You want healthy, vigorous, pure bred chicks—the kind that mature quickly and develop into early layers. We have them—"HIGH GRADE and SPECIAL CERTIFIED BLOOD TESTED MATINGS." For six years they have been the best investment for thousands of chick buyers from coast to coast. Better than ever for 1924. Fourteen best paying varieties. Moderate in price. Satisfactory Service. Our big, illustrated chick catalog gives complete information; it's free; write for your copy today.

LAWTON A. REILING, Dept. 54, BELLEVUE, IOWA.
One of the largest hatchers and distributors in the world.

Write for the Free Book



Olde-Tan Team Lines

20 Feet Long
1 Inch Wide
Main Line Double and
Stitched at Center

\$5.45
A Set

These lines are offered to you at price which represents only the actual cost plus mailing. We are making this offer to put a sample of Olde-Tan leather in your hands. We want you to see and feel this real old fashioned white oak bark tanned leather, the very same leather used in Olde-Tan harness. This offer will not appear again except as an advertising offer so take advantage of it now before it is gone. Write now. Ask us to send you a set of lines.



**Olde Tan
Harness**

Metal-to-Metal Construction

\$7.50
DOWN

**Puts it
on Your Horses!**

WRITE TODAY for the Free Olde-Tan Metal-to-Metal Harness Book which tells you how, for only \$7.50 down, you put this Olde-Tan metal-to-metal harness on your horses. You don't need to send any money. We send the harness before you pay a cent. After the harness reaches you, make the first payment. The balance may be paid at the rate of a few dollars each month.

OLDE-TAN Harness is *not* a new fangled patented totally different and strange looking harness. Just the opposite is true.

Fully Adjustable

It is a commonsense harness that looks like the harness you are accustomed to. It is fully adjustable, the same as your other harness. Closer inspection, however, shows that at many points it is different and a great improvement on all other harnesses.

Metal to Metal

Practically No Buckles

Every strap is 100% protected from all contact with metal rings and loops by our metal protectors. At every point the chafing and rubbing is between metal and metal. This easily gives double life to the straps.

There are but few buckles instead of the fifteen you usually find on a harness, yet we give you every adjustment you have always had. Buckles are done away with wherever strength is needed (buckles

cut down the strength of a strap 30%) yet we give you the few buckles you need for convenience in taking off and putting on the harness.

Common-Sense

And so it is from beginning to end — every item has received such practical and commonsense consideration that you instantly appreciate its general all around superiority and practicability. Your own commonsense judgment will tell you this harness will easily give you double wear at least.

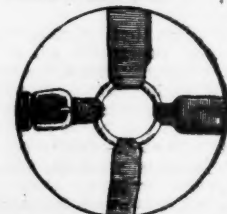
Quality Leather

But big as these commonsense improvements are, they would not amount to much unless we had the quality of leather to go with it. For this reason, we say the *only* big reason for OLDE-TAN success is the leather itself. Olde Tan leather is the best harness leather in the world, tanned by a family of tanners — 70 years reputation and experience back of every strap. The same old time quality (slow process tanning) now as 70 years ago. You know what that means when it comes to wear. Every Olde-Tan Harness is made by the same men who tan the leather.

Don't let another day go by without receiving the booklet giving you the details regarding Olde Tan harness. It will be the means of cutting your harness expense in two.



Metal-to-metal construction. All wear is metal against metal. Leather held tight without play or friction. Note special riveted metal extension in breeching.



Never this wearing and cutting of straps in metal-to-metal construction. All pull, strain and wear is on metal.



BABSON BROS.

19th Street & Marshall Blvd., Dept. 26-02 Chicago

Please send me free your Olde-Tan Harness book and all about your \$7.50 down and easy monthly payment offer on Olde-Tan Harness.

I am ☐ including \$5.45 for lines.

Print name and address plainly

My Name.....

My Address.....

WRITE
for the Free Book Today!

It tells you just why you should replace your old worn out harness with Olde-Tan long wearing metal-to-metal harness. Learn how the leather is tanned to give its superior quality. Learn all about our liberal \$7.50 down and easy monthly payment offer. Send for the book at once.

BABSON BROS. Department 26-02 19th St. and Marshall Blvd. Chicago, Ill.
Distributors of Melotte Cream Separators and Edison Phonographs.

for
DUR
en
ha
investi
than a
Through
Southern
energy
control
citrus
fornia
tacking
fruit tre
west la
fruit tre
ularity

Fig. 1—
feet
rig
phot
exte
28 ft

creasing
because
derived
scale.
Oil em
additions
secticide
known a
lied eco
the star
that are
similar
that is
effective
efforts o
in popul
did not
tent for
as a resu

Oil Spray Suggestions

by Leroy Childs
Hood River Experiment Station

DURING the past few years oil emulsions for orchard spraying have received more attention by investigators throughout the country than any other contact insecticide. Throughout the Middle West and Southern fruit-growing districts this energy has been directed towards the controlling of San Jose Scale; in the citrus districts of Florida and California for various scale insects attacking orange, lemon and grapefruit trees, and in the Pacific Northwest largely for the control of the fruit tree leaf roller, though the popularity of oil sprays are rapidly in-

creasing in this fruit-growing area because of the benefits that can be derived as a means of controlling scale.

cently found its place as one of our leading insecticides.

Unfortunate Results Occurred in Early Use of Oil.
During the early commercial trials of oil sprays applied to fruit trees, some unfortunate results occurred which blacklisted this material. Whether due to faultily prepared emulsions or due to applications made at the wrong season of the year, a number of orchards were seriously injured and some killed outright. The publicity resulting from these occurrences naturally made in-

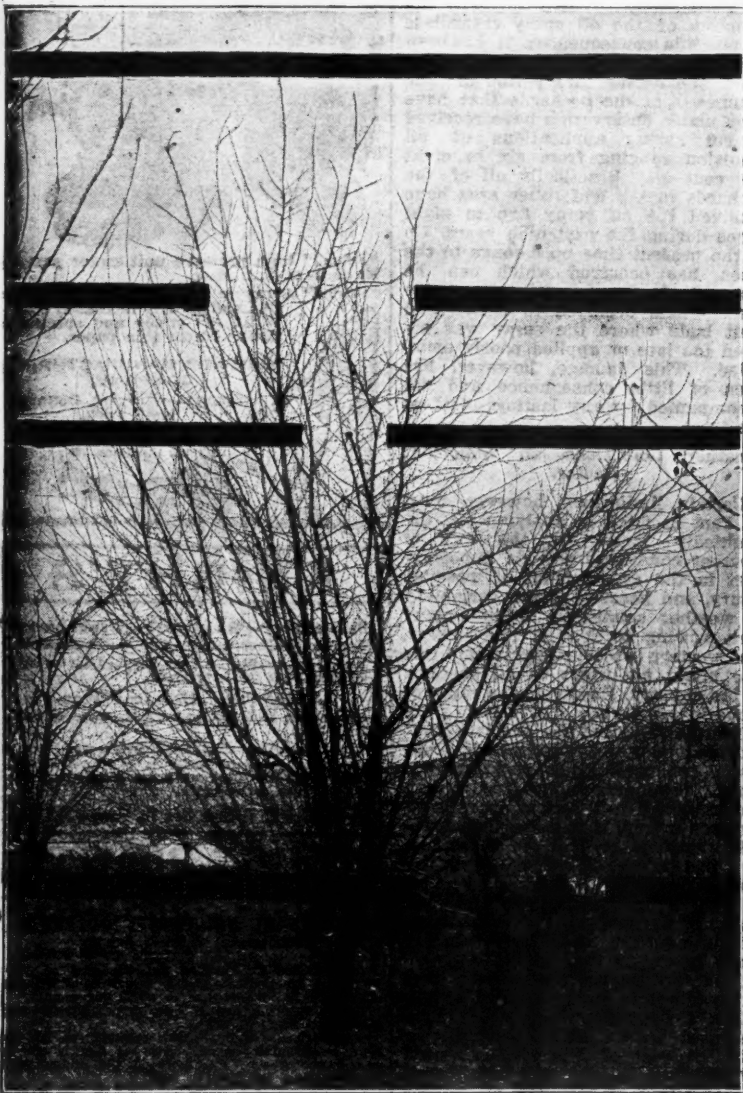


Fig. 1—Not enough attention is given to spraying the tops of trees. Above 22 feet much care must be given to cover all parts. Spray from a tower on rig if there is much spraying of this sort to do. (First or bottom line in photograph represents a height of 5 feet; next line, 17 feet—spray rod extended to limit; third line, 22 feet—limit of effective work; top line, 28 feet.)

creasing in this fruit-growing area because of the benefits that can be derived as a means of controlling scale.

Oil emulsions are by no means new additions to the list of available insecticides. These materials were known and used by some of our earliest economic entomologists, not in the standardized commercial forms that are on the market today, but are similar to the home-made product that is proving quite popular and effective at the present time. The efforts of these earlier entomologists in popularizing oil sprays, however, did not take place to any great extent for some reason or another, and as a result this material has only re-

investigators very conservative with reference to their recommendation and made fruit growers very skeptical as to the advisability of applying oil in any form. For a good many years following these unfortunate experiences, oils were used only to a very limited extent. Then in 1908-1910 came a very serious outbreak in Colorado of the Fruit Tree Leaf Roller, a ravenous fruit and leaf-eating caterpillar. After testing practically every known insecticide that offered any promise whatsoever, Gillette and Weldon demonstrated that heavy oil emulsions were the only material that could be relied upon to give relief in cases of serious infestation. Four years later the writer



SPRAY MATERIALS AND DUSTING MIXTURES

Will Help You Make—

BETTER FRUIT — BETTER PROFITS

Write for our SPRAYING and DUSTING GUIDE and pamphlets describing—

KASULIME: the famous "dry-mix" summer spray which controls scab and brown rot on peaches.

LIMEBOR: the best summer spray for apples. Better than Lime-Sulphur solution because it controls scab and fungous diseases without causing leaf injury.

NAPHICIDE: the new "gas-dust" which kills all forms of aphids. The most perfect means ever devised for the application of Nicotine.

We manufacture—

ARSENATE OF LEAD CALCIUM ARSENATE
BORDEAU MIXTURE COPPER-LIME DUSTS
SULPHUR DUSTS PARIS GREEN KALIBOR

Write for our prices.

NITRATE AGENCIES
BAYONNE COMPANY NEW JERSEY

If we are not represented in your district ask for information concerning our AGENCY PLAN

Send Today for Full
Details About
"Fruit-Fog"
The Biggest Thing in Spraying

Use less solution, spray faster, and do a real job! That is possible with Hayes FRUIT-FOG, the result of 300 lbs. guaranteed pressure and the famous Hayes spray nozzle. FRUIT-FOG forms an atomized superspray of wonderful filtering and adhering power which gets to and kills ALL the diseases and pests which destroy your crop. You get more fruit in poor years, better fruit in good years—more profits every year!

Cut Your Spraying Costs

You can now suit your ideas of price and get the famous Hayes "Fruit-Fog" Sprayers in sizes 3½ to 16 gal. per minute capacity, with or without trucks, engines, or equipment. The smallest Hayes Sprayers have the same high pressure, long life, and corrosion proof pumps as the largest.

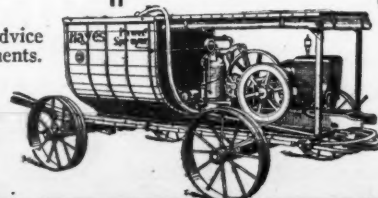
Send for Catalog

Showing complete line—and get advice of spray experts on your requirements.

Distributors and Dealers in all principal cities.

HAYES PUMP & PLANTER COMPANY
Dept. 12 Galva, Illinois

Full line of Power Sprayers, Traction Sprayers and Hand Sprayers.



Hayes "FRUIT-FOG" Sprayer
Without Equipment

You can get any size Hayes "Fruit-Fog" Sprayer without equipment if you wish—and get "Fruit-Fog" results at minimum cost. What you lack we will furnish at rock bottom prices consistent with Hayes quality.

Hayes 1903 (Below)—A 150-gallon sprayer which has made a nation-wide reputation. Send for folder, which gives complete description.

HAYES "FRUIT-FOG" SPRAYERS

kills

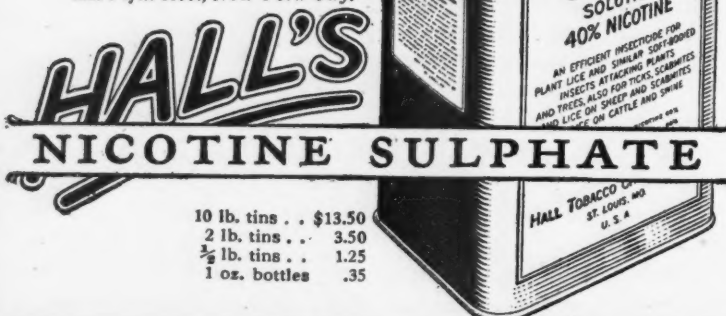
them every time

HALL'S Nicotine Sulphate kills plant lice and similar insects. You can depend upon it to rid your trees of these pests. Being a vegetable extract, it will not harm fruit, flower or foliage.

It is very economical also. Made up as a spray, it costs less than 2c. a gallon.

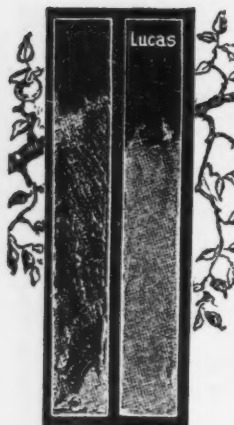
Buy from your dealer. If he is not supplied, send us your order along with his name.

HALL TOBACCO CHEMICAL CO.
212 Fifth Ave., New York City.



10 lb. tins . . \$13.50
2 lb. tins . . 3.50
1/2 lb. tins . . 1.25
1 oz. bottles . . .35

Government Supervision



Coatings of competitive brands of Arsenate of Lead on glass slides show greater uniformity for the Lucas brand without adding "spreaders." The Lucas coating will STICK, too, through severe spraying with water in imitation of rain.

It is quite generally thought that because the Government exercises the closest supervision of the chemical composition of insecticides and fungicides that it is almost impossible for one brand to be better than another. This is not the case, for the Government does not limit the physical improvement of spray materials such as finer particles, greater adhesiveness or more even spreading, except as regards any additions such as spreaders or glues. Therein is where

LUCAS

Arsenate of Lead more than complies with Government requirements. The particles are of the very finest, insuring greater suspension and more uniform mixture. This fineness causes the particles to stick without the use of glue, just as fine dust sticks to window panes through hard rains. And furthermore, this fineness does not cause abrasion, the tendency of very fine particles to group together into spots or ridges, because of the special Lucas Cohesion Neutralizer—which is not what is known as a "spreader." "Spreaders" dilute the poison 10 to 20% and are therefore not allowed in insecticide and fungicide packages.

Put Up In Powdered Form No freezing, lumping or difficult mixing. No freight to pay on water—which constitutes about 50% of paste mixtures. Sold in convenient and self-proof containers of from 1-lb. to 200-lb. sizes. Send for the Lucas Spraying Guide.

John Lucas & Co., Inc.

PHILADELPHIA
NEW YORK PITTSBURGH CHICAGO BOSTON OAKLAND
ASHEVILLE FRESNO LOS ANGELES
ATLANTA HOUSTON MEMPHIS
DENVER JACKSONVILLE SAVANNAH

Lucas

Insecticides-Fungicides

"Purposefully Made for Every Purpose"

- | | | | |
|----------------------|------------------------|------------------|-------------------|
| 1. Arsenate of Lead | 4. Arsenate of Calcium | 7. Pruning Paint | 10. Fish Oil Soap |
| 2. Bordo Mixture | 5. Bordo Green | 8. Paris Green | 11. Sulphur |
| 3. Bordo-Arsenate | 6. P. B. K. | 9. Arsenic | 12. Blue Vitriol |
| 13. Dry Lime Sulphur | 14. Nicotene "46" | | |

conducted tests in the Hood River Section where the leaf roller was doing much damage and the practicability of oil sprays in this section was clearly demonstrated. With the spread of leaf rollers in damaging proportions through the Pacific Northwestern fruit belt, has followed the use of oil sprays, so that at the present time they are not only being used extensively in the sections already mentioned, but in many parts of Washington, Idaho and Montana, as well as in certain parts of California.

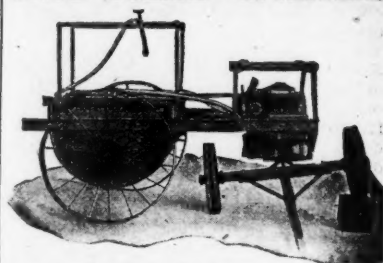
Ten years ago, at the time the writer first started work with oil sprays, the big question in the minds of the growers was that of possible injury to trees. The idea of damage from such usage still prevailed from earlier reports, where oil had been used followed by injury. However, the leaf roller situation was such a desperate one that ruin faced the growers if the pest was allowed to go uncontrolled. The result was the adoption of the oil spray regardless of possible consequences. It has been nine years since that decision was made and during that period of time a number of the orchards that have been under observation have received annual spring applications of oil emulsion ranging from six to eight per cent oil. Practically all of the orchards in the leaf roller area have received the oil spray five to eight times during the past nine years. Up to the present time no damage to the trees has occurred which can be traceable to the use of oil. Some damage has occurred to leaves and fruit buds where the spray was applied too late or applied poorly emulsified. This damage, however, has been of little consequence and not accompanied by any lasting effect to the trees.

Weather Conditions an Important Factor.

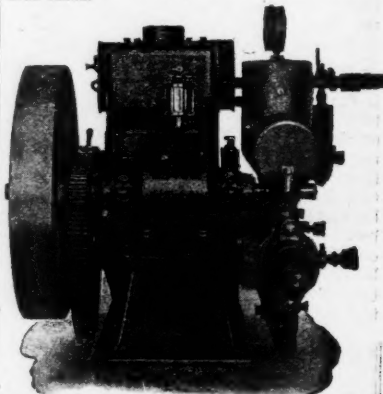
Certain limitations, however, must be kept in mind in applying oil. Undoubtedly factors in the way of weather conditions play an important part in the development of possible injury, and because of the variability of weather conditions in the many fruit-growing sections of the country, our western observations along this line might not apply in all sections of the country. However, the range of climatic conditions prevailing from California to Montana indicate that provided certain precautions are taken, the possibilities of injury are slight. Two outstanding factors are known which will bring about serious tree injury. It is more than probable that one or both of these factors are responsible for the injury that occurred in the early usage of oil and which resulted in the long disuse of the material. The most important of these conditions bringing about injury is that of fall application of the spray. The damage that can result from sprays applied in late fall or early winter was clearly demonstrated in an Idaho orchard in 1919. A part of this orchard was sprayed late in November with a well known brand of miscible oil at the rate of one gallon of the oil to 15 gallons of water. Approximately two weeks after the spray was applied, a minimum temperature of 23 degrees below zero was reached. The sprayed trees failed to throw out blossoms and leaves normally the following spring and by midsummer a large percentage of the trees were dead. The unsprayed trees adjoining made a normal growth. This is the only case of extensive tree injury that has ever come to the writer's attention, and is, without question, a case of oil injury—an avoidable injury which can be prevented by spraying at the proper season of the year.

The theory advanced as a cause of the development of this injury seems logical and a condition that is not applicable to spring applications. Fall or winter sprays are applied to trees in a semi or practically dormant state. Little or no sap movement occurs at that time. Through a process of freezing and thawing, it is suggested that oil is pulled into the trees. There being no bathing of the

TRUE "FRIEND" SPRAYERS



The "Friend" type sprayer. Low down, short turning, easy drawing, made in several sizes.



"Friend" high pressure unit motor pump. Made in several sizes.

"Friend" sprayers have national distribution and greatly increased sales. Write for prices and specifications. Name this paper.

"FRIEND" MANUFACTURING COMPANY,
Gasport, Niagara County, New York.



KNIGHT'S

Strawberry—Raspberry—Blackberry
Currant—Gooseberry—Grape—Asparagus
Same high quality we have supplied for nearly 40 years, but we have made

A Big Reduction in Prices

Our catalog tells how to grow big crops of fine fruit from

"Champion—The Best Everbearer and many standard varieties. Cultural directions make the book of great value—but we send it free, write today.

David Knight & Son, Box 76, Sawyer, Mich.

BERRY PLANTS

TRANSVAAL UNIVERSITY COLLEGE

(University of South Africa)
Pretoria, South Africa.

Applications are invited for the post of Professor of Horticulture, at a salary of £728 per annum by ten increments to £989 per annum.

Duties to commence as soon as possible but not later than April 1, 1924.

Applications (in duplicate) accompanied by recent testimonials, a certificate of health and a recent photograph, should reach the undersigned on, or before, February 6, 1924.

Citricultural experience will be a strong recommendation.

If the successful applicant come from overseas, passage money will be refunded to the amount of £75 if he be a married man and £50 if he be unmarried.

(Sgd.) A. A. ROBERTS, Registrar.

FRONTIER SPECIAL FAMOUS SIDE SWING



20-SHOT "PANTHER" RAPID FIRE AUTOMATIC
LIMITED quantity of brand new, 32 cal. "Panthers." 10 shots with extra magazine making 20 rapid fire shots. Special at above guns all shoot any standard American cartridge. PAY POSTMAN ON DELIVERY plus postage. Money back promptly if not satisfied.
CONSUMERS CO., Dept. 81WW, 1265 Broadway, N.Y.

for tender sues, oil re ciently. Where death of spr prevail freeze cause oil int

The result sified in an tree tank, the ta has Trees charac to a is very should to th tank two re be ob bility emulsi liquid two p the bo

Fig. 2—time aphid left;

the tre the tam water a tank la oil une

At th able m the mar are exc others who are should purchas of prov insect c grade of cial oil above 8 eight pe sufficien stable, The fru of maki federal demonst the so-c sion. Th

Red E Potash Water The oi in a vess boil. Th placing li using liv materials pump tw sure. Pw essary, t tained by

tender cambium and sap wood tissues, because of tree dormancy, the oil remains about the cells sufficiently long to destroy this tissue. Where this condition is general the death of the trees result. At the time of spring application, sap movement prevails and there is little chance of freezes of sufficient extent as to cause extensive penetrations of the oil into the tree tissues.

Poorly Emulsified Oil Sprays.

The second cause for tree damage results from the use of poorly emulsified oil sprays. Oil of a heavy grade, in an unemulsified state, will cause tree injury. Free oil exists in the tank, particularly as the last part of the tank is sprayed if the oil spray has not been properly prepared. Trees sprayed with material of this character invariably develop injury to a more or less extent; often this is very serious. Poorly emulsified oil should never be used; it is economy to throw away the material in the tank rather than use it as spray, for two reasons: First, control will not be obtained, and second, the possibility of injury occurring. Where the emulsion is not properly made the liquid in the tank consists largely of two parts, oil on top and water in the bottom. As spraying proceeds,

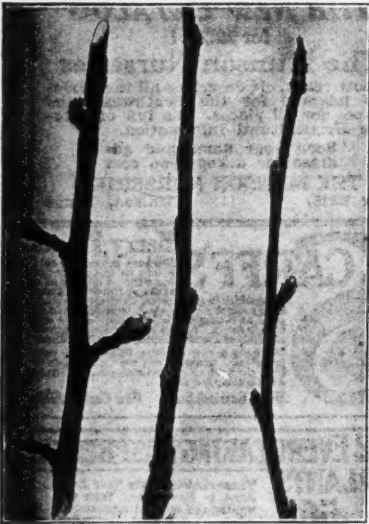


Fig. 2—Good bud development at which time to apply oil spray for scale, aphids and leaf roller. Fruit buds left; leaf buds right.

the trees receiving the first part of the tank are sprayed largely with water and those at the end of the tank largely with a sticky mess of oil unemulsified.

Red Engine Oil Emulsion.

At the present time there are available many brands of oil sprays on the market. Some of these materials are excellent; others good and still others of very poor quality. Growers who are using commercial oil sprays should be careful in making their purchases. Use only established lines of proved articles. Many failures in insect control can be traced to a poor grade of oil spray. A good commercial oil emulsion should contain well above 80 per cent oil, not more than eight per cent water and emulsifier in sufficient quantities as to produce a stable, readily prepared emulsion. The fruit grower also has the option of making his own oil spray. Many federal and state investigators have demonstrated recently the efficacy of the so-called Red Engine Oil emulsion. This is prepared as follows:

Red Engine Oil.....2 gallons
Potash fish-oil soap.....2 pounds
Water1 gallon

The oil, soap and water are placed in a vessel and brought to a vigorous boil. This can be done by either placing ingredients over a fire or by using live steam. While still hot, the materials are passed through a force pump twice at at least 60 pounds pressure. Pumping under pressure is necessary, an emulsion cannot be obtained by ordinary stirring. Properly

A LONG TIME INVESTMENT

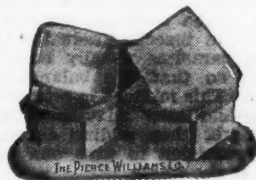
Every Dodge Brothers Sedan body is steel built throughout—sills, pillars, panels, frames and all.

This all-steel design—exclusively a Dodge Brothers feature—possesses certain practical advantages which recommend it most emphatically to the closed car buyer.

It reduces cost, assures a structural precision which is particularly evident in the snug fit of doors and windows, and results in a staunchness of construction which guarantees to the owner a long time investment—and a long time satisfaction.

The price of the Type-A Sedan is \$1385 f. o. b. Detroit

DODGE BROTHERS



Baskets for Apples, Peaches, Plums, Grapes, Tomatoes, Cucumbers, Beans, etc. Boxes and Crates for Berries, Cucumbers, Celery, Cauliflower and vegetables of all kinds.

PLANT BOXES

Catalog mailed on request

The Pierce-Williams Co. South Haven, Mich. Jena, Ark.

Cultivated Whitesbog Blueberries

a popular and profitable fruit

Pure-bred Whitesbog Blueberries average well over one-half inch in size. Delicious, practically seedless. Have excellent shipping qualities. Command highest market prices. Bushes are vigorous, heavily productive. Every variety tested and named. Easy to pick, easy to cultivate, hardy, long-lived.

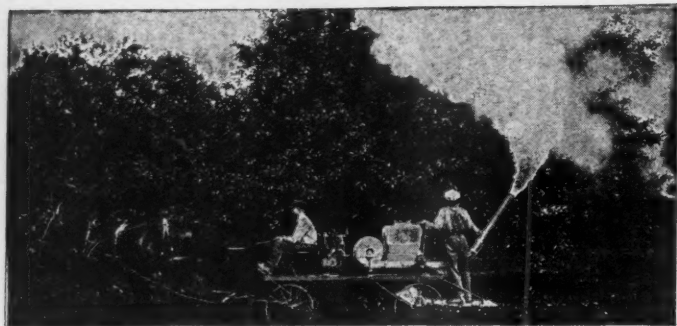
Send for new circular illustrated in colors, giving full particulars on varieties and cultivation. Attractive price offers to commercial growers.

WHITESBOG BLUEBERRY NURSERIES

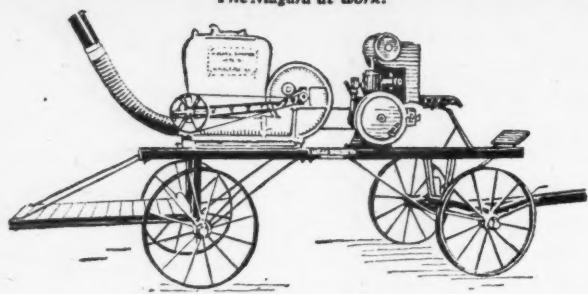
Headquarters for Pure-Bred Blueberry Plants.

Joseph J. White, Inc.

Box A, Whitesbog, N. J.



The Niagara at work.



This pen and ink drawing of the

Niagara Orchard DUSTER

shows you its sturdy, compact construction, its simplicity of design and its minimum of parts, all of which are your very best guarantee of its long working life.

We make Hand, Traction, and Power Dusters in various Models to meet different Crop requirements.

Send for Free Dusting Catalog

Implement Dealers should write for our Co-operative Sales Plan.

It has been proven that season after season Niagara Dusters will keep on doing their work just as efficiently as the first day they were run—and that's one reason why fruit growers have found the Niagara method of protecting their crops less expensive than any other known method.

A glance at these features will tell you why Niagara Dusters, the pioneer dusters, have made good wherever fruit is grown.

The hopper, fan and fan housing are aluminum, light, strong and rust proof. The fan revolves on Hyatt Roller Bearings. The hopper holds 100 lbs. and has a big opening at top easily filled through large funnel.

But what has made dusting finally successful is the celebrated, patented Niagara cylinder of brushes. It sweeps dust free from lumps, through the feed-screen, into the air chamber, then a continuous air blast drives the dust atoms through a patented flexible rubber hose and metal discharge pipe onto the trees.

To get posted on Dusting and learn about the time, money and labor-saving features of Niagara Dusters,

Send Today for the Big Descriptive Catalog

Remember with the Niagara you and a boy can protect 5 acres of mature apple orchard, 6 acres of citrus grove or 4 acres of field crops per hour.

It will pay you to call on the Niagara dealer or write and find out just what model Duster and what Dusts are best to use. Our specialists are at your service.

Niagara SPRAYER COMPANY

Middleport, New York

Western Office, 2598 Taylor St., San Francisco, Calif.

Pioneers Makers of

Niagara

DUSTS and DUSTERS

made, this emulsion will keep indefinitely; freezing, however, will cause it to break down.

For scale control a two to three per cent emulsion has been found to give good results. Three gallons of the above stock solution to each 100 gallons of water will give a two per cent emulsion. Where insects such as the leaf roller are to be controlled, the strength must be increased to at least six per cent.

The writer's experiences with oil sprays leads him to believe that most growers will eventually find it most economical in the long run to purchase commercial brands of oil sprays rather than to prepare their own even though the initial cost is higher. This has been true of practically all other spray materials now used. Standardization is established, the loss of time avoided when it is often needed for other orchard practices, and above all, when a good commercial spray is used, the chances of applying a spray possessing poor emulsifying qualities and accompanying possibilities of tree injury are reduced to the minimum.

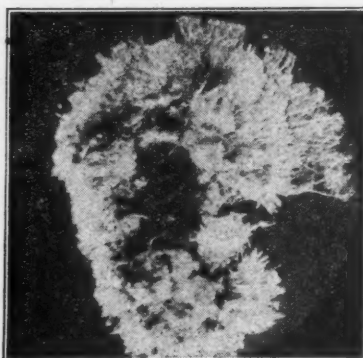
In the final analysis, oil sprays can not be efficiently used unless very careful spraying is done. Use plenty of material and cover every part of the tree. Scale can be present from top to bottom and it must be remembered that only those insects actually hit are destroyed. A little carelessness in allowing a few to survive can result in nullifying the efforts made towards the control of these pests. Poor results obtained in spraying in such cases are often charged to the material used when in reality the grower himself is at fault.

Figure 1 demonstrates a study that was made at Hood River to determine the effectiveness of spraying with the spray rods. Above a height of 22 feet extra care must be given with either rods or gun if all pests are to be covered. In orchards possessing an area of any great extent above this height, it is desirable to spray from a tower on the machine whether guns or rods are used. To cover tops thoroughly, some spray must be wasted—it will pay in the long run.

Citrus Insects and Diseases

(Continued from page 35.)

well as the injurious ones. The insects thus freed of their fungous checks increase and spread rapidly. Unless the proper insecticides are promptly used, trees are seriously in-



Pink fungus or purple scale (much enlarged).

jured, sometimes killed. By applying the combination, the fungi are destroyed, and at the same time, the insects that at the time are upon the trees. As the insects gradually return, their parasites usually accompany them so that the balance is maintained. This mixture is prepared by making Bordeaux mixture of desired strength, then adding concentrated oil emulsion to give one per cent of oil to the whole.

This Bordeaux-oil mixture is used for controlling scab on grapefruit and Satsumas in early spring on tender growth. Where much scab was present the previous season, it is advisable to make a spraying before growth starts, especially on young non-bear-

Get My Complete List of Fruit Trees

I grow every tree I sell. That's why I can absolutely vouch for their quality. My fruit trees are all propagated by experts, they are planted the proper distance apart, accurately grafted, and are true-to-name. They have the strongest and healthiest root systems to be found anywhere. They will grow and thrive when transplanted.

Special prices to growers

You can't beat my prices on A-1 Nursery Stock. Tell me what varieties interest you most, and how much you expect to set out this year. If you want quality stock that will make more money for you be sure to write me today. Ask for my complete catalog of high producing trees, shrubs and seeds. Full of photographs—lots of bargains. Deal direct with a grower. Write Now.



Earl E. May, President
MAY SEED & NURSERY CO.
340 May Bldg.
Shenandoah, Iowa

FREE MAY'S 1924 NURSERY STOCK AND NURSERY CATALOG

STRAWBERRY PLANTS

\$2.50 Per 1000, and up. Our strong, healthy, tremendous bearing plants guarantee big crops of luscious berries. Best varieties for all kinds of soils. Many new varieties such as Eaton, Bus Special, Premier, Marvel and Cooper. The world's greatest new everbearing Strawberry CHAMPION. Full line of Raspberries, Blackberries and Asparagus. GLADIOLI—ROSES—ORNAMENTALS. Greatly Reduced Large Stock of good Grape Plants. Reduced at \$30.00 per thousand and Grapes for all places. Beautiful new color catalog free. Write Today. BRIDGMAN NURSERY CO., Box 2, Bridgman, Mich.

THE NEW CATALOG

for 1924 of

The Munson Nurseries

is now ready. It describes all the varieties adapted for the Southwest, and Grapes for all places. It's full of valuable Horticultural Information.

Send your name and address for a copy—no cost

THE MUNSON NURSERIES

Box B315, Denison, Texas

SCARFF'S Berry Plants

We have grown and sold plants to the public for more than a quarter of a century. Have 100 Acres in the heart of the South. Ship promptly. Our stock is reliable and as good as money can buy. See our new color catalog and true to name. We are nurserymen and grow all kinds of Plants, Shrubs, Trees and Vines. We have a new seedling Strawberry, very promising. We will send you three plants to test, along with our new Catalogue. We have a Free Copy for You.

W. N. Scarff & Sons, New Carlisle, Ohio

12 EVERBEARING RASPBERRY PLANTS

These choice plants bear from June to November. Take advantage of our get acquainted offer. Plants sent at proper time for planting. Send today. Arkansas Seed & Nursery Co., Dept. C2, Fayetteville, Arkansas

GET OUR FREE CATALOG

CONDON'S GIANT TOMATO

"QUEEN OF THE MARKET." Big Money-Maker. Large, solid fruit, excellent canner. To introduce to you our Northern Grown Live Seeds and Plants, we will mail you 125 seeds of Condon's Giant Everbearing Tomato and our Big 1924 Garden and Farm Guide, 1924 Page Book, tells how, and what to plant. From lower than ever. SEND POSTAL TODAY. CONDON BROS., Seedmen, Rock River Valley Seed Firm, ROCKFORD, ILLINOIS

SPRAY YOUR ORCHARDS WITH DuBOIS' OIL EMULSION the most effective of all known sprays for scale at one-half the cost of Lime-Sulphur. Write for facts and how to save money. H. A. DuBOIS & SONS, Inc., Cobden, Ill.

TREES AND PLANTS

Direct from grower at lower prices. Apple and Peach trees, Asparagus and Berry Plants. Privet and Berry hedging. Guaranteed. Write for new price list. WESTMINSTER NURSERY, Dept. 75, Westminster, Md.

Stevensville Strawberry Plants

Make Bigger Profits Grow the Best

Grow berries that bring top prices. Our select varieties are large in size, firm, wonderfully luscious, big yielders. Healthy, vigorous, deep-rooted. Ideal for all soils. Cash in on our 50 years experience in developing big pay strains. COOPER, World's biggest berry—CHAMPION, the ever-bearing sensation. PREMIER, earliest of all. Splendid line of RED AND BLACK RASPBERRIES, BLACKBERRIES, CUMMINGS, BERRYBERRY, DOUGHERTY, ORNAMENTAL SHRUBS, GLADIOLI, TULIP BULBS, ROSES.

GRAPES Tremendous stock. All at big savings. Satisfaction guaranteed or money back. Send for large beautiful FREE catalog in true colors. Tells how to plant, care for and raise big crops. A valuable book to own.

STEVENSVILLE NURSERIES Stevensville, Mich.

You Can Have a Better Garden

A few cents more spent for better seeds means the difference between an "average" garden and a bumper crop of choice vegetables. Soil, climate, cultivation—all are important—but dependable seed is the big secret of successful gardening. For more than seventy years

LIVINGSTON'S TRUE BLUE SEEDS

have been the choice of leading market gardeners—and thousands of home gardeners in every state in the Union look to Livingston's for their yearly supply of Vegetable, Field and Flower seeds. Write today for 1924 Annual—and to make sure of a better home garden—this year—send your order for

Choice Collection, 50c

One full size package each Beans, Beet, Cabbage, Sweet Corn, Cucumbers, Lettuce, Peas, Radish, Spinach, Tomato and Turnip. All popular sorts. Attractive 1924 Seed Annual FREE.

THE LIVINGSTON SEED CO.,
123 E. Chestnut St., Columbus, O.

Plant our Giant Roots—and profit immediately

Don't wait 2 or 3 years before you begin to profit from asparagus. Plant our Giant Washington Roots—cut asparagus next year.

Our Giant Washington Roots are sure to live—rust resistant, vigorous growing, big producers. Giant green stalks, 1" to 2" thick, exceedingly tender and delicious, always commanding a premium price.

A \$1.00 packet of seeds or 50 roots for \$5.00 will plant sufficient to supply an average family for 20 years. Or send \$3.00 for 25 roots. Orders post-paid, cultural directions included. Attractive prices for 1 to 10 acre plantings.

Write to-day for price list and valuable free booklet.

RIVERVIEW FARMS

Box 18 Bridgeton, N. J.

WRITE FOR OUR **FREE** BIG CATALOG OF RELIABLE **SEEDS**

Garden, flower and field seeds, plants and bulbs. We furnish best of tested seeds. Sure to grow. At reasonable prices.

J.W. OSAGE SEED CO., Dept. 57 Ottawa, Ohio

SEEDS that Repay the Farmer

There's an unusual variety of dependable seeds and an abundance of hardy fruit trees listed in our

70TH ANNUAL FREE CATALOG

1200 fertile acres give wide selection. Let the R. & H. Catalog help you select the best. Write to-day.

THE STORRS & HARRISON CO.
Nurserymen and Seedsmen for 70 Years
Box 521 Painesville, Ohio

PEACH & APPLE TREES BEFORE BUYING GET OUR PRICES

It will pay you. Direct to Planters in Large or Small Lots by Express, Freight or Parcel Post. FREE 68 Page Catalog. Pear, Plum, Cherry Berries, Gr. os, Nuts. Shade and Ornamental Trees, Vines and Shrubs.

TENN. NURSERY CO., Box 10, CLEVELAND, TENN.

For PEACH TREES—APPLE TREES—STRAWBERRY PLANTS For Commercial Planters Write **CHATTANOOGA NURSERIES**, Chattanooga, Tenn.

FREE BOYS AIR RIFLE

This fine Rifle free for calling only 15 pieces of our jewelry at the cash. Write for jewelry today.

EAGLE WATCH CO., Dept. 126, EAST BOSTON, MASS.

SEND US YOUR FILMS

Mail us 36 with any size film for development and 12 prints, or send us 12 negatives, any size, and 24 for 12 prints. Trial 57 enlargement in hand—same folder, 25c. Overnight Service.

ROANOKE PHOTO FINISHING CO.
320 Bell Ave. Roanoke, Va.

FREE Length 30 inches. Steel Barrel and Parts—Walnut Stock—Powerful accurate air rifle. Free for calling 15 packets perfume Powder at 10 cents.

JONES MFG. CO., Dept. 368 ATTLEBORO, MASS.

ing trees; and for melanose soon after the petals have fallen.

A well-planned spray schedule for citrus includes the use of Bordeaux-oil early in the season, oil emulsion after fruit are an inch in diameter for white fly and scale insects during the rather dry months of spring, the use of some form of sulphur for rust mite when they appear in serious numbers about June, the use of parasitic fungi during the rainy season of July and August, and a clean-up spray for white fly scale insects and rust mites, if they are sufficiently numerous in October or November, of oil emulsion with soluble sulphur dissolved therein.

The Spring Chicken Crop

(Continued from page 37.)

ter, colony house. Brood the chicks to weaning age, then remove the brooder and permit the chicks to remain in their accustomed quarters until marketed or carried to maturity. Of course the cockerels are taken away when they reach broiler weight, thus giving the pullets more room.

Do not make the too frequent mistake of placing the big brooder and large family of chicks in quarters which are too small. House room costs less than chicks. For the 300-chick flock, let each brooder pen be at least 10 by 10 feet in size, larger if possible. The ideal plan is the two-room system, each brood having a warm room containing the brooder and a connecting cool room to which the chicks may go at will. Give the growing youngsters a wide range of temperature; let each one choose the place where it finds the greatest comfort.

During the next few weeks, then, the bound-to-win poultryman will do several important things which will all have a great bearing upon the season's results. He will decide upon the number and breed of layers he can carry next winter—he will arrange to hatch the chicks at the required date or have them delivered from a responsible hatchery at that time—he will get brooders and brooder houses ready and tested before the chicks are due—he will secure the needed feed troughs and water founts to accommodate the number of chicks decided upon—he will provide the fuel required for the brooders—in short, he will be "all set" to give his future layers a good start in life and keep them moving steadily in the right direction.

If these important matters are neglected or put off until the last moment, the enterprise may be a failure, a loss to be met instead of good profits pocketed. Take the time NOW to consider and plan. The chicks you grow this season will make money for you or will be money-losers, depending in large degree upon how you treat them from hatching time to laying maturity. This is one part of the season's work which simply cannot safely be slighted.

Notes on Spray Machinery

(Continued from page 26.)

or other material. Such valves are also more easily replaced when worn, and all valves wear out more quickly under present day high pressures than formerly.

Valve seats are also subject to a great deal of wear, and should be made of some hard non-corrosive alloy. Manufacturers usually prefer to make it of slightly softer material than the valve so that most of the wear will come on the seat. This arrangement is all well and good provided this seat can be easily and cheaply replaced. They are usually made of bronze, but some are made of rubber composition. In some pumps, the valve cage and valve seat are in one piece, but as a usual thing, they are separate. The kind of seats which screw out when replaced should be avoided because they become corroded and will be difficult to remove. Some of them are so made that when one side is worn the seat may be reversed, thus giving double the amount of service.

(Continued on page 50.)



Top-Dressing Talk No. 3

"EASY FRUIT" they say—

The gain a fruit crop makes when the trees are well fed is worth many times the cost of the fertilizer.

Apples. Trees need nitrogen, especially those in sod, and respond to it with higher yields and better quality. Prof. R. B. Cruickshank of Ohio State University raised the yield from 6½ bushels per tree to 15½ bushels of a better grade, by applying Sulphate of Ammonia.

Peaches. Nitrogen applications increase yield and promote vigor. Mr. L. B. Veeder of Baldwin, Ga., who regularly fertilizes his 12,000 trees, reports that Arcadian Sulphate put on late in February enabled trees to hold the fruit through a severe freeze.

Prunes. The response of prune orchards to nitrogen has been convincing. Arcadian Sulphate applied on the Blauer Ranch, Saratoga, Calif., for seven years, has averaged over 1,100 pounds gain of dry fruit per acre.

Grapes. Whether you produce grapes to be used fresh or for raisins, your vineyard needs nitrogen and will respond to its use. Mr. F. H. Telkamp of Parlier, Calif., applied Arcadian Sulphate to his vines and made an increase of 2,200 pounds of raisins per acre.

But—this isn't half the story. Write for free bulletins on the crops you grow. These bulletins will help you as they have helped others. Use the coupon.

The *Barrett* Company

Agricultural Department

Medina, Ohio

Atlanta, Georgia

Berkely, Cal.

New York, N. Y.

The Barrett Company (address nearest office)

Please send me sample package of Arcadian Sulphate of Ammonia.

I am especially interested in.....
(write name of crops on line above)

and wish you to send me bulletins on these subjects.

Name

Address

Take the Blindfold Off Your Eyes!



Why let "custom" keep you in darkness and rob you of extra profits you could easily make? Why not investigate The Fruit Auction Company's method of selling fruits and vegetables, and find out for yourself how much more satisfactory it is than your present method?

You'll be surprised to learn how much **higher** prices average by auction. Yet it will be easily understood when you consider that by our method of selling, more than 300 eager buyers are concentrated in one large auditorium, each outbidding the other in order to get goods he must have to carry on his business. When the bidding begins, the excitement starts. Up—up—UP creeps the price bid on your

Fruits and Vegetables

The auction price every lot brings is recorded and printed in an independent daily publication—the New York Daily Fruit Reporter.

The proceeds of sale are mailed to you within 24 hours. Only our small selling commission is deducted.

Simply because you have never sold at auction is no reason why you should deprive yourself of the better price and other advantages offered. It is never too late to begin.

We absolutely guarantee a fair and square deal.

Write for booklet "More Dollars for Fruit Growers." It is interesting and instructive. It's FREE.

The Fruit Auction Co.

Established 1896

202-208 Franklin St., New York City



"Farming in California"

This free booklet may start you on the road to a better life. Written by authorities, it answers questions you want answered. California farmers have controlled irrigation, and own their water systems. They don't have crop failures for want of moisture. California crop values are 100 to 200 per cent better than the average for the whole United States. Send for any or all of these booklets. Free!

1. Farming in California
2. Deciduous Fruit Growing in California
3. Pure Bred Stock Raising in California
4. Dairying in California
5. Poultry Raising in California

All are written by authorities, published and mailed without charge by Californians Inc., a non-profit organization interested in sound development of the State. Mail the coupon now.

CALIFORNIANS, Inc.

San Francisco, 140 Montgomery St., Room 901

Please send me booklets checked

1 2 3 4 5

Name

Address

New Ideas

Cutler's new catalog of Fruit Packing and Grading Machinery is alive with new ideas and authoritative information for the orchardist. Tells packing methods of big, successful growers.

It will do you good just to read it!

Cutler Mfg. Co.

Fruit Packing Machinery

353 E. 10th St.
Portland,
Oregon

Get these
Facts—
**WRITE
TODAY!**

Just
off the
Press

Free to
growers of
Apples, Pears
and Peaches



Timeliness of Apple Scab Control

(Continued from page 33.)

the upper and lower surface you will find minute black dots, hardly larger than the point of a pin, occurring in clusters. These are the winter or early spring forms of the fungus which causes apple scab.

The writer maintains that growers must familiarize themselves by close observation with these forms of apple scab. They must know, too, the nature of the parasite with which they are dealing. Apple scab is the name we give to the blemish caused by a fungus—a mold—which grows upon the apple fruit, leaves and twigs. A parasitic fungus is a low form of plant life whose vegetative body consists of threads and whose fruiting form is composed of minute seed-like structures called "spores." This fungus grows upon the apple as weeds grow upon a soil, sending its root-like growths into the tissues, and thus stealing its living.

Life Story of Scab.

The life story of the apple scab fungus is well known to technical

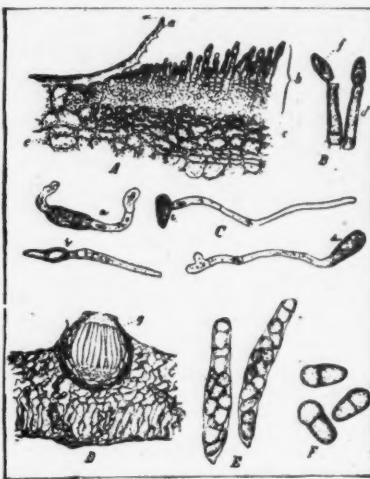


Fig. 3.—Apple Scab (*Venturia inaequalis*). Microscopic structure of the scab fungus. Section through a scab spot on an apple showing the fungus (b) spreading under and lifting the cuticle (a) from the partly disorganized cells of the apple (c); (e) healthy cells of the apple; (f) two spore-bearing stalks giving rise to summer spores (conidia) (g); (h) spores germinating; (i) portion of section through an affected leaf of apple which has lain on the ground over winter and has given rise to the winter spore stage of the disease, (j) spore case (perithegium) containing a bundle of spore sacs (asci); (k) two spore sacs (asci), more highly magnified, each containing eight two-celled winter spores, three of which are shown at F. All highly magnified. (After Longyear.)

workers in horticulture and it should be well known to practical growers. Such knowledge is vital if the fine points in control are to be practiced. The life story of this "weed" which grows upon the apple foliage and fruit is fairly simple, and by reference to the diagram accompanying this article may readily be followed (Fig. 3). In considering this diagram, note that the fungus, or mold, is shown enlarged many times and what you are viewing are thin slices of the diseased tissue showing the fungus as it appears upon the affected part.

In the spring, while the apples are still dormant, the apple scab fungus is developing on the fallen leaves of last season. All through the winter the fungus has been ramifying in the dead leaf tissue and has completely impregnated the leaf. In early April in our section, the winter stage of the fungus is developing as the small pinpoint clusters of black spore cases already mentioned (Fig. 3 D). With every hour of growing temperature, the sporecases grow in size and eventually mature their spores. These spores are peculiar bodies, admirably produced to accomplish their purpose, viz., the producing of scab. They are formed inside of tube-like sacks and when ripe, and when wet by warm

(Continued on page 51.)

MICHIGAN GROWN BERRY PLANTS

All the well-known, tried and tested standard varieties of fruit plants, produced under the most favorable conditions in quantity in the Michigan Fruit Belt at low prices.

Send for your copy of our valuable book with handsome illustrations to color, check-full of valuable information for berry growers.

New Ground Strawberry Plants the deep-rooted kind our specialty. They are the big profit-makers.

We will include with your Berry Plant Book a package of choice Pansy Seed for the lady of the home. Several fancy varieties without cost.

BALDWIN-WHITTEN-ACKERMAN NURSERIES
Box 61, Bridgman, Mich.
Successors to
O. A. D. Seldin
& W. A. Watten & Son
A. R. Weston & Co.

Strawberries

Grow the Kellogg Way

Yield Big Profits

Our Free Book tells how. Written by the Strawberry King. Gives his secrets for growing the Big Crops of Fancy Strawberries that won him fame and fortune. Worth its weight in gold. Costs nothing—It's FREE.

R. M. KELLOGG CO.
Box 1209 Three Rivers, Mich.

CLOVER \$4.90 Per Bu. AND-TIMOTHY

BIG BARGAIN—Sample Free—SAVE MONEY. Red Clover and Timothy mixed—Standard Grasses, unsurpassed for hay or pasture. Contains nice amount clover—ready to sow. Thoroughly selected, guaranteed and sold subject to your test and approval. A real Bargain. Have Pure Clover, Alfalfa, Clover, Timothy and all Field Seeds at amazingly low prices. Write for free samples and catalog. American Field Seed Co., Dept. 546 Chicago, Ill.

Free for Testing

A pair of Mated Everbearing Strawberry Plants Free if you will report your success with them. Bees visit the berries and blossoms on a single plant in Sept. Send 10 cents for mailing expense or not as you please. Catalogue of HARDY BULBARD, BELLY Fruit, Ornamentals, Potted Bulbs, Winter Flower Basket, etc., etc. One dozen genuine Progressive Everbearing Strawberry plants mailed at planting time for 50 cents or 4 dozen for a dollar, if ordered now.

THE GARDNER NURSERY CO., Box 312, Osage, Iowa

Choice Strawberry Plants \$3.75 per 1,000. All standard varieties. Guaranteed first-class or money refunded. Catalog. MRS. FILENA WOOLF, Dept. D., Allegan, Mich.

EVERGREENS

Hill's Hardy Tested Sorts

Best for windbreaks, hedges and lawn planting. Protect buildings, crops, stock, gardens and orchards. Hill's Evergreens are nursery grown and hardy everywhere. Hill's Evergreen book sent free. Write today. Beautiful Evergreen Trees at moderate prices. World's largest growers. Est. 1855.

THE D. HILL NURSERY CO., INC., DUNDEE, ILL.
Box 237 Evergreen Specialists

Burpee's Seeds Grow

Sow Burpee's Seeds and you will see How they Grow!

Burpee's Annual is our Catalog. It describes Burpee's Seeds with color pictures of the best vegetables and flowers. If you are interested, Burpee's Annual will be mailed to you free. Write for your Annual today.

W. ATLEE BURPEE CO.
Seed Growers Philadelphia

Please send me a free copy of Burpee's Annual. 105

Name

R. D. or St.

P. O. State

MARKETS AND MARKETING

REAL winter weather, in fact 18 below zero, greeted the delegates to the sixth annual convention of the American Fruit & Vegetable Shippers' Association when they arrived in Chicago January 5. However, the below zero weather did not stop the meeting and a record attendance was on hand at the opening session at 2:00 p. m. in the main ballroom of the Drake Hotel.

The meeting was called to order by President Charles E. Virden and in his snappy characteristic style welcomed the members and guests and then set forth a few of his ideas as to problems that should have the attention of the association during the coming year. President Virden pointed out very clearly that in his estimation there were too many trade associations and went on record as being strongly in favor of a merger or other means of drawing the trade bodies closer together and thereby eliminate a great deal of duplication of effort. This suggestion was met with applause from the delegates in general, indicating that the same thought was in the minds of many present.

Transportation problems in general were discussed and, with reference to rates, he stated that some revisions were imperative; that rates should be such as to justify and sustain a transportation service of merit, at the same time encouraging production and shipping.

A general discussion followed and a great many subjects were covered during the following sessions and on Tuesday afternoon officers for the ensuing year were elected. The new officers are F. E. Nellis, president; John Denney, first vice-president; A. U. Chaney, second vice-president; Joe Steinhart, third vice-president; Ray Hanley, sergeant-at-arms, and the reelection of E. S. Briggs as manager-secretary.

SOUTHERN California orange shipments during the first week of January were 474 cars as against 206 cars the previous week. Central California shipped only 206 cars as against 255 cars, the previous week, and Northern California 20 cars as against 23 cars.

The total shipment of oranges and lemons combined were 806 cars for the same time as against 549 the previous week. For the season up to January 8, California has shipped a total of 8,953 cars of oranges and lemons.

STRAWBERRY growers are busy at this season of the year. Florida reports their crop is not as far advanced as a year ago and a lighter yield per acre seems probable. The present movement is increasing and reports from the prominent shipping points at the time of going to press indicated that by the middle of January shipments would be heavy.

Tennessee reports that their 1924 strawberry crop will be increased several hundred acres over last year's crop. Growers are setting out plants by the thousand and 1925 promises to bring forth a bumper crop. In one day more than 100,000 strawberry plants were received at a local office consigned to one grower.

In the Sarcosie section of Missouri a great deal of interest is being shown among the strawberry growers and it is estimated that about 285 cars will be shipped this season.

Howell County (Missouri) reports that the strawberry growers in this section are getting organized and are making plans for increasing the acreage in their county so that shipments

can be made to central markets in carloads. Adjoining counties are showing a marked increase year after year.

Bald Knob, Ark., also reports marked activity in strawberries and the formation of the Bald Knob Strawberry Ass'n.

THE annual meeting of the Martinsburg, W. Va., Fruit Exchange, an organization through which the principal growers of this section market their apples, was held the latter part of December and proved to be a very successful meeting. Statistics released at this meeting show that the apple crop from Berkeley, Jefferson and Morgan counties amounted to 1,400,000 barrels, which means an approximate net profit to the growers of \$3,375,000. About 10 per cent of the crop is still in storage.

THE 1924 grape outlook for California was covered very fully at the fifty-sixth State Fruit Growers' and Farmers' Convention held at Santa Ana in December. Director George H. Hecke, in his report, referring to the grape problems, said:

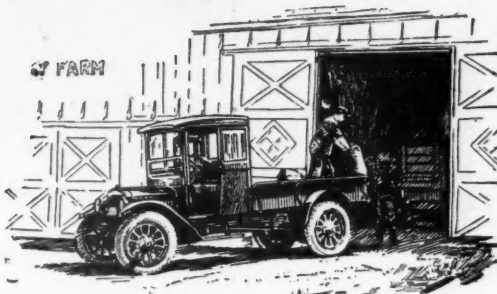
"Probably the most dramatic situation in California at the present time, so far as the farmer is concerned, exists in the grape and raisin industry. There are over 600,000 acres of all classes of grapes, bearing and non-bearing, in California at the present time. The San Joaquin Valley, especially the lower San Joaquin Valley, depends essentially on the raisin industry and thus making this crop one of major importance to the state. The high prices received during the war resulted in tremendous increases in plantings, but while prices could be controlled in a measure, it was absolutely impossible to control production, and as a result production has increased to a point where new markets must be sought all over the world if the raisins of California are going to be marketed successfully.

"This season there were shipped out of California in the fresh state approximately 50,000 cars of grapes of all classes. This tremendous total represents an increase in shipments during the past 10 years unparalleled in any line of agricultural production. As late as 1916, less than 10,000 cars of grapes were shipped out of the state. Next season, with normal weather and crop conditions, there will be in excess of 60,000 cars of this commodity alone to be moved. A general demoralization in the fresh grape market may be anticipated unless serious attention is paid to the quality, condition and manner of packing of this commodity."

TOTAL apple shipments from the Wenatchee Valley to January 1 were slightly less than 13,400 cars of about 78 per cent of the total crop, which is now estimated by shippers at less than 17,500 cars. Not quite 1200 cars were moved during December. The weather has been favorable for the movement of the fruit, but owing to the condition of the market, there is no disposition on the part of shippers to hurry the apples eastward.

Last year only about 7800 cars had been moved to January 1, or about 57 per cent of the crop, and two years ago 12,250 cars had been moved, or 86 per cent of the total shipments for the season. Last season the big apple movement took place during January, when P. F. E. and U. R. T. cars to the number of about 2500 were received here and moved through the Spokane gateway.

General Motors Trucks



Power—Speed—Economy GMC TRUCKS

Speed on the highway—power to pull over bad roads or in the orchard—a large carrying capacity—these combined with economy of operation and maintenance are the essentials of a fruit grower's truck. And, in GMC is found a full satisfactory answer to every demand.

GMC is built for hard continuous service every part, both of engine and chassis, is made oversize for strength and to insure uninterrupted service throughout and even beyond the normal life of the truck. Moreover every moving part of GMC operates in a bushing or bearing that is quickly and easily replaceable.

Full information regarding GMC, its performance, construction, exclusive features and the economies it effects are given in our free illustrated booklet "Motor Trucks on the Farm." Send for your copy today.

GENERAL MOTORS TRUCK COMPANY

Division of General Motors Corporation
PONTIAC, MICHIGAN



GMC Trucks are "Seven Steps Ahead"



30 Factories
Give You
BETTER
SERVICE

SAVE
MONEY!

Buy Baskets Now

Every year shrewd buyers save money by buying their stock of baskets in February. Prices invariably go higher later in the year. So place your orders now and be sure and specify P. S. C. Baskets; the straight side, broad bottomed kind, extra well built of heavier veneer. They look better, ship better, store better and bring higher prices for your fruits or vegetables.

Write for 1924 Illustrated Apple Book

Every car lot shipper should have our 1924 Apple Book; packed full of valuable facts; also ask for prices on your year's requirements in bushel and half bushel baskets.

PACKAGE SALES CORPORATION

22 Union Trust Bldg., South Bend, Indiana



Miami Beach road lighted with General Electric Novalux Highway Lighting Units. More than 300,000 miles of improved highways in the United States are unlighted.

Friendly ties of light



Thirty years ago the General Electric Company built for the New York Edison Company a generator with a lighting capacity of 16,000 candle power. Now G-E is furnishing light and power companies with generators 80 times as powerful as this wonder of 1894.

Since 1878, when electric street lights first appeared, electricity has become a giant worker, performing a myriad of tasks. The use of electricity has quadrupled in ten years.

The advance of electrical engineering is now carrying far-flung electric lines over the countryside, lighting highways as well as streets—linking communities with “ribbons of light.”

GENERAL ELECTRIC

KINKADE GARDEN TRACTOR and Power Lawnmower

A Practical, Proven Power Cultivator for Gardeners, Suburbanites, Truckers, Florists, Nurserymen, Fruit Growers. American Farm Machine Co. 2534 Uni. Av. S.E., Minneapolis, Minn.



U.S. RECORD—\$2,059.20
1 acre set same year. Champion Ever-bearing Strawberries. Bears 5 Mos. after set 60 days. Illustrated CATALOG FREE. Originator, Edw. Lubke, Rt. New Buffalo, Michigan.



Planet Jr. No. 12 double-wheel hoe

Your biggest cash crop

What do you grow that is more important than the food you eat? Why spend good cash for food that can better be raised right on the place and the money kept at home? With a Planet Jr. seeder and wheel hoe the small labor item is nothing compared with the better living and big cash saving of home-grown, home-stored vegetables. They pay an income every day in the year.

Give the boy a Planet Jr. Wheel hoe with a garden to work on shares. He'll learn more farming that way than from a roomful of books. The new catalog tells the story. Get one from your dealer or from us.

S. L. ALLEN & CO., Inc.

Largest Manufacturers of Specialized Field and Garden Tools in the World

Dept. 26
5th & Glenwood Avenue
Philadelphia

Look for
“Planet Jr.”



Planet Jr.

Care of Bees in the Spring

by H. F. Wilson

NORMALLY, we think of the different seasons of beekeeping as spring, summer, fall and winter. It would be much better if we were to start the year in the fall rather than in the spring. The beekeeper's year should be divided into two periods, the period of preparation for the honey flow and the period of crop production.

The first period extends from early fall until the time of the next year's honey flow, which may be from April to June, depending upon the section of the country. In the northern states this period would be from about August 15 to June 1. The period of honey production usually only lasts from two or three to six or eight weeks, and the crop gathered will depend to a very large extent upon the attention given the bees during the period of preparation.

If the bees are in first-class shape at the beginning of the honey flow, a maximum crop may be expected. If the bees are not in shape and have to build up during the honey flow, a minimum crop can only be secured.

Period of Preparation.

The period of preparation should begin by providing young queens. All colonies having queens more than two years old should be re-queened. Many of our beekeepers have found it advisable to re-queen every year. At a later period in the fall, conditions should be provided so that an abundance of young bees will be reared before brood rearing ceases in the fall. When a colony starts into the winter with many old bees and few young bees, the beekeeper will find his colonies dwindling badly in the spring. Up until recent years, spring dwindling was thought to be a disease but now we know it is due to the dying off of the old bees.

There is considerable difference of opinion as to whether bees winter better in the cellar or in out-door packing cases. As a whole, I believe, that bees packed out-of-doors are usually in much better shape at the time of the honey flow than bees wintered in the cellar. This is not because packing out-of-doors is a better system but rather because when bees are wintered in the cellar, they are not given the protection in the spring which ordinarily does exist in the case of bees packed out-of-doors. It is far more important that bees be in packing cases or double walled hives in the spring than it is in the fall or even winter. A comparison of the existing conditions in fall, winter and spring will help to point out the reasons for this. Experiments show that when bees do not have brood in the colony they can keep the cluster temperature at the required point without much loss of energy. On the other hand, during the brood rearing period, which always begins in the spring, it is not only necessary for the bees to keep up the normal cluster temperature but they must also create a higher temperature for the hatching of brood. In other words during the normal fall and winter period it is only necessary to keep the temperature up to from 70 to 80 degrees Fahrenheit in the center of the cluster while during the brood rearing period it is necessary to keep the temperature above 90 degrees Fahrenheit (also during the fall and winter period the bees are only consuming sufficient food to develop heat in the cluster) while during brood rearing they must not only keep the temperature at a much higher point but they also have to produce the food which goes to feed the developing brood. This, of course, requires large amounts of energy and if the colonies are in single walled, unprotected hives, they are easily affected by even slight changes of temperature. Cold spring winds easily penetrate the hives and drafts draw away considerable heat which would be preserved by even a small

amount of protection, such as a slip-over cover. It is for this reason that colonies in packing cases have a much better chance to build up in the spring than colonies of bees in single walled hives. If the beekeeper has been careful to provide colonies with plenty of stores the previous fall, it is not necessary to disturb the bees until late in the spring when continued warm weather occurs.

Setting Out Cellar Wintered Bees.

For the bees in the cellar we must consider the best time for setting these out in the spring. The time when bees should be set out in the spring is generally based upon the blooming of the willows, and in the northern tier of states this takes place about the first of April.

A few beekeepers set out their bees as soon as the snow disappears, while the majority plan to set them out between April 1 and April 15. If outside protection is to be given, then bees may be set out at an early date at the convenience of the beekeepers. If they are not to be given outside protection, the time of their removal from the cellar should be governed by their condition and the weather. If any colonies are restless or suffering from dysentery they should be set out as soon as the weather is sufficiently warm for them to fly. On the other hand, if they are quiet and have plenty of stores they may be kept in the cellar as late as April 15. Investigations of climatic conditions in the north indicate that the first spring thaw normally comes between the tenth and fifteenth of March and that the next warm period is likely to occur between the twentieth of March and the first of April. Observations show that bees can fly with safety when the temperature in the shade is as low as 45 degrees Fahrenheit, provided the sun is shining brightly and cold winds are not blowing. Days of this kind appear in more than an average number of years after March 20 and before April 1, and if the snow is off the ground, a beekeeper may set his bees out with the assurance that they will be able to have a cleansing flight at that time. If bees are known to be short of stores, they should be set out during the warm spell in March and given sufficient amounts of sugar syrup to carry them over until they can gather nectar.

Planning the Spring Work.

At the first opportunity, when bees are flying freely, each colony should be examined to see if any one is queenless or too small to build up by the time of the honey flow. All such colonies should be united with others to make them of average strength. It is almost useless to keep colonies that do not cover five or six frames at least. At the same time, examine the stores to see if there is enough for each colony to produce a maximum of brood. Each one must have at least 25 pounds of stores at the beginning of the spring period, for maximum brood rearing. If conditions are such that the bees cannot gather nectar in the field, additional stores must be given later. If honey stores are not available, feed sugar syrup two pounds to one pound of water, heated until the sugar is thoroughly dissolved.

The next most important matter is to see that each colony has more than enough room for brood rearing. A ten frame hive body is not sufficient for a strong colony and two hive bodies should always be provided about the first week in May, or earlier if a colony has seven or eight frames with brood. The extra room will also be of great benefit in preventing swarming as it is the crowded condition in a colony which most frequently causes bees to swarm. If all of these details are taken care of, the beekeeper may be assured that when the honey flow begins he will have strong colonies of bees.

BETTER HOME DEPARTMENT

Making the Kitchen a Better Place to Work

by E. W. Lehmann

THE FARM kitchen has been rightfully called the farm women's work shop. Every effort should be taken, therefore, in planning the kitchen, selecting and arranging the equipment, so that it will be not only an efficient work shop, but an attractive place to work and to bring one's friends, for most women delight in showing off the kitchen if it is one of which she is proud.

Whether you are planning a new kitchen or remodeling an old, the first questions would pertain to the room itself, its location, its size, the number of windows, the entrances, lighting, ventilation, the finish, etc. Some thoughtful farm woman said, "Locate the kitchen first and then plan the rest of the house to it." This is not such a bad idea; the kitchen should have a good outlook, it is well to be able to see the road, main entrance if possible, and the barns and other buildings from the kitchen windows. A corner kitchen with at least two windows for cross light and ventilation is desirable. If an outside entrance to the kitchen is provided, it is desirable to have an additional entrance for the men from work so they do not have to use the kitchen as a passageway. A farm hired girl, who took a pride in having a spotless kitchen, said the two requirements for a kitchen are: To plan it so it cannot be used as a passageway and so it cannot be used as a wash room.

To have more than three doors opening from the kitchen is usually a disadvantage unless the kitchen is unusually large. The large kitchens are going out of style because of the loss of time in preparation and serving of food. A kitchen practically square so that all equipment is in easy reach should not be much more than 140 to 150 square feet; however, many convenient kitchens are smaller than this.

For the convenience and happiness of the housewife, provide a floor covering that is easily cleaned and is grease proof. A good quality linoleum is about as good covering as one can get at a reasonable price. The walls are best finished with flat paint and all wood work enamelled so it may be easily cleaned. The lower part of the wall is better when covered with a sanitas or an oil cloth applied like paper. Many attractive tile designs can be secured that make the kitchen attractive and it is easily cleaned.

One authority on household subjects has emphasized the point that in buying equipment it should be put on the basis of making an investment. We should not think so much of the first cost, but on how many times the particular equipment will be used and how much time is saved at each use, and also the effect on the quality of job done.

No attempt will be made in this article to discuss all the great variety of equipment and devices, storage, etc., needed to make the kitchen a more efficient workshop. A few of the more important, more neglected and yet inexpensive pieces will be mentioned.

Water systems for the farm home were discussed in a previous article. A sink and drain, at least, should be

found in every kitchen. If there is no water under pressure a pump at the sink would be the next improvement along this line. We must not overlook the fact that once the kitchen is equipped with those things necessary for food preparation, the next most important is a means of providing water right at hand and to provide a means of disposing of the waste water, for water is needed at nearly every turn in the work of the kitchen.

Among the inexpensive items of equipment that add much to the convenience and efficiency of the housewife that I will mention is a simple, narrow shelf placed directly above the sink or work table. A lot of things needed many times during the day can be placed on this shelf in the plain view of the worker as an openly equipped carpenter's box brings his tools to view. Underneath the shelf put in a number of screw hooks. On these hooks will be found a convenient place to hang such articles as the dish mop, the egg beater, big stirring spoons, measuring spoons, small cleaning brushes, etc. It only takes a little time to put up such a shelf and the expense is practically nothing. A board, one by four inches, and a few simple brackets and screw hooks that can be secured at any ten-cent store is all that is needed. It is assumed that the housewife can bring enough pressure to bear to get it put up.

Another item of equipment that is inadequate in many kitchens is the storage space. Storage for dishes, storage for food, storage for pots and pans, storage for cleaning equipment and materials and just more storage is the continuous cry of many women. On investigation it may be found that the storage now available is not being used efficiently, much of the space is cluttered up with stuff seldom or never used. The best place for such stuff is in the attic or it should be sent to the first church rummage sale. Simple open front shelves make good storage space for the dishes, pots, pans, etc., that are used from day to day. Other provision must be provided for food. The kind and extent of storage space that can be built may be limited by the pocket book. Modern built-in storage is something most every woman would like to have and yet there is a lot of poorly used closed space in these elaborate cupboards. Other simple equipment that should be considered to make the kitchen more convenient should include a built-in fuel box open to the outside or to the basement for filling, a sanitary can for garbage, and a work stool and comfortable work chair.

With the idea of making better kitchens the household extension specialists of a number of the state institutions have worked out kitchen score cards. This work has been done in co-operation with the agricultural engineering specialist because of his knowledge of the mechanics of the problem. The farm women interested should secure a score card through either the county farm or the home agent. With the aid of this card she can gain a better idea of where her kitchen falls short of the ideal as set up by people studying this question.

This spray is inexpensive, safe and easy to handle

This new development in spray oil has been thoroughly tested by state experimental stations and private growers. It's not an experiment. The results have been uniformly successful.

You can mix this oil with any ordinary water and use this mixture alone or by adding Bordeaux, nicotine solutions or lead arsenate. It works well in any of these combinations for it's both an insecticide and a remarkable spreader and sticker.

It stays mixed and it "stays put"—resisting the washing action of rain. Brisk stirring by hand is enough to make it emulsify. Heat and special equipment are unnecessary.

Its action is safe and sure. It is harmless to use and clean to mix. It causes no harmful chemical reactions—contains no chemicals.

It gives a wonderful control because it gets into all crevices and crannies of bark and foliage.

SUNOCO

SELF-EMULSIFYING
SPRAY OIL

is very inexpensive and it will not deteriorate from season to season. It will not freeze in its original form nor will it clog or corrode spray apparatus.

You can prevent blotchy, russeted fruit and make your output more marketable if you use this remarkable spray oil. *And you'll save yourself all kinds of trouble.*

Send for our newly-completed, instructive book—"Simplified Spraying." Fill in the coupon and it will come promptly, postage free.

SUN OIL COMPANY

Philadelphia

Cut out this coupon and mail today

SUN OIL COMPANY
Limited, MONTREAL

Branches and Agents
in Principal Cities

MAKERS OF THE
FAMOUS SUNOCO
MOTOR OILS AND
GREASES

Please send me full information on
Sunoco Spray Oil, with Prices.

Name.....

Address.....

SUN OIL COMPANY
Philadelphia, Pa.

How Federal Land Banks Help Farmers Get Ahead

THROUGH membership in a mighty cooperative loan system, nearly 300,000 farmers are paying off their mortgages. Through the twelve Federal Land Banks these farmers are securing better terms and lower interest rates. Besides, every borrower shares in the profits earned. Already, more than \$7,000,000 has been paid as dividends.

Money for these mortgage loans is gotten through the sale of Federal Land Bank Bonds. Money invested in these Bonds helps to build up the farming business by providing needed capital.

Federal Land Bank Bonds have all the safety of good farm mortgages, plus additional guarantees.

Federal Land Bank Bonds are free from all taxes, except inheritance taxes. Interest received from them is free from income taxes.

You can turn Federal Land Bank Bonds into cash on short notice or use them as security for a bank loan.

Federal Land Bank Bonds yield a regular income, payable twice a year. Price and interest rate on request.

Federal Land Bank Bonds may be had in denominations to fit your bank account: \$40, \$100, \$500, \$1,000, \$5,000 and \$10,000. Your choice of coupon or registered form, delivered by registered mail. Correspondence confidential. Remember, the words "The Federal Land Bank" appear at the top of every bond issued by a Federal Land Bank.

Should you desire a Federal Farm Loan, apply to the Secretary-Treasurer of the nearest National Farm Loan Association. Your County Agent can give his name and address.



Write today for free pamphlet, "Getting Together To Get Ahead." Address the nearest Federal Land Bank or the Fiscal Agent at Washington, D. C. Support your only national cooperative lending and investing system, by putting your surplus funds into Federal Land Bank Bonds.

Federal Land Banks are located at

Springfield, Mass.
New Orleans, La.
Wichita, Kansas

St. Louis, Mo.
Berkeley, Cal.
Omaha, Nebr.

Louisville, Ky.
St. Paul, Minn.
Baltimore, Md.

Columbia, S. C.
Houston, Texas
Spokane, Wash.

Fiscal Agent

FEDERAL LAND BANKS

Washington, D. C.

FREE



Lancaster County Seed Co., Station 2, PARADISE, PA.

\$3 Brings you a Genuine **UNDERWOOD** TYPEWRITER

10 DAYS FREE TRIAL Your \$2.00 unconditional returned if at end of 10 days you are not satisfied with this late model UNDERWOOD typewriter rebuilt by the famous Shipman Ward process.

GREAT PRICE SAVING Direct to you from the largest typewriter factory of its kind in the world by our money saving methods.

EASY MONTHLY PAYMENTS So small that you will not notice it while you enjoy the use of this wonderful machine.

FREE BOOK OF FACTS Explaining Shipman Ward's wonderful system of rebuilding typewriters and also valuable information about the typewriter industry both instructive and entertaining.

Act Today!
Mail
Coupon



5
Year
Guarantee

Shipman Ward
Mfg. Company
3332 Shipman Building
Montrose & Ravenswood
Aves., Chicago

Name.....
St. and No.....
City..... State.....

ALL THIS FREE

Gold-plated Lavaliers and Chain, pair Earbuds, Gold-plated Expansion Bracelet, with 100 Watch, guaranteed quality and 2 Gold-plated Rings, ALL FREE for sending only 15 pieces Jewelry at 10 cents each.

EAGLE WATCH CO.,
Dept. 125 East Boston, Mass.

STRAWBERRY PLANTS \$3.95 UP

Grape Vines At Lowest Prices

Bargain prices on highest yielding, big rooted, healthy, northern grown plants. Thrive in all soils. Choice of Eaton, Sun Special, Cooper, Premier and others. Prices sharply reduced on Blackberry plants, Black and Red Raspberries, Fruit Trees of finest grades. All stock inspected. Guaranteed.

WRITE FOR FREE CATALOG OF BARGAINS
DASS NURSERY CO., R. R. 6 Bridgman, Mich.

MUSIC LESSONS FREE

You can read music like this quickly

IN YOUR HOME. Write today for our FREE booklet. It tells how to learn to play Piano, Organ, Violin, Mandolin, Guitar, Banjo, etc. Beginners or advanced players. Your only expense about 2¢ per day for music and postage used.

AMERICAN SCHOOL OF MUSIC, 74 Lakeside Bldg., CHICAGO

CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL



House Flies Dangerous

"THE PRESENCE of flies is an indication of uncleanness, unsanitary conditions, and improper disposal of substances in which they breed. They are not only annoying; they are actually dangerous to health, because they may carry disease germs to exposed foods." Thus reads an indictment against the house fly in a bulletin put out by the United States Department of Agriculture.

It is necessary, therefore, that housewives, farmers and whole communities wage unceasing war against these disease and filth-bearing pests. One family alone can do very little towards keeping down the fly menace, but a whole community aroused to the need for concerted action can practically eliminate the fly.

Teach Control Measures.

The first step is to conduct an educational campaign through posters, lectures, pictures, the schools, etc., so that every member of the community will have exact knowledge of fly prevention and control methods found most effective and workable. Each must also come to realize the danger of disease epidemics through germs carried by the fly.

There are several kinds of flies, but the most universal and numerous is the common house fly. It is medium-sized and is distinguished from other types by four black stripes on the back. The house fly does not bite, as its mouth is made to suck up liquid substances. The body of the house fly is covered thickly with hairs and bristles of varying length, and this is especially true of the legs. Thus when it crawls over infected material, as human excreta or barnyard manure, it readily becomes loaded with germs, and later visits to human foods result in their contamination. Even more dangerous are the "vomit spots" deposited by the fly, which contain thousands of living disease bacteria.

It has been proven that house flies do not live through the winter by hiding in cracks and crevices of buildings, etc., in the adult stage, but they may hibernate in the pupa stage—the one just preceding the adult stage. In the earlier stages of development they can survive in manure heaps, etc. The second way flies can pass the winter is by continuous breeding—thus they gather in a building which offers both food and breeding places and survive through several generations.

Flies Multiply Rapidly.

Flies multiply very rapidly, a generation requiring but 11 to 14 days in summer for complete development and to again reproduce. When you consider that the female lays approximately 120 eggs at one time and lays at least two and possibly four such batches, which in turn will be ready to reproduce in about two weeks, the enormous numbers in which the insects occur are plainly accounted for.

The ideal breeding place for the fly is the manure pile, which offers warmth, moisture and food. It will lay its eggs on a great variety of decaying vegetable and animal materials, but prefers the first place mentioned. In the absence of manure, it breeds in slops or fermenting vegetable matter, such as hops, moist bran, ensilage and rotting potatoes. The eggs are deposited below the surface in the cracks, several females usually depositing in one spot. The eggs hatch in 24 hours under ideal conditions.

Now that we have discussed some

of the habits of the fly, we are ready to apply this knowledge in getting rid of the pests, through prevention and control measures.

A careful screening of windows and doors during the summer months, with the supplementary use of sticky fly papers, is a protective measure against house flies known to everyone. It is only necessary to emphasize the importance of keeping food supplies screened or otherwise covered so that flies can gain no access to them. Screening does not lessen the number of flies, but it does prevent food contamination.

Fly poison preparations are common. Many of the commercial fly poisons contain arsenic, and their use in the household is attended with considerable danger, especially to children. A weak solution of formalin will be less dangerous—use three teaspoonfuls of commercial formalin to a pint of milk or water sweetened with a little brown sugar. A sodium salicylate solution has been found almost equally effective, using three teaspoonfuls of the powdered chemical to a pint of sweetened water. The best way to expose these poisons is to fill a glass with the liquid, place a saucer or plate lined with blotting paper bottom up over the glass, and invert the glass. Then place a match stick under the glass, and you have a good poison fountain. The sugar attracts the flies.

Fly traps of screen can also be made, but they are some trouble to make, and other methods have been found even more effective.

New Poison concocted.

There is a new commercial poison on the market—a liquid which can be blown into the air or onto a window pane—which kills any insect that comes in contact with it. It does not harm woodwork or wall paper. One bottle will last all summer. The chief disadvantage is the temporary disagreeable odor.

The best way to fight flies, however, is to prevent their multiplying by the elimination of their breeding places. Disposal of manure will be found the greatest problem on the farm. Many methods have been tried and some found entirely successful. It is suggested first that the stables be so constructed as to be easily and completely cleaned to prevent flies laying their eggs in the corners, etc. It is pointed out that the manure should be removed every three days, or at least twice a week, during the summer months. This is done because the fly larvae will leave the manure in two or three days as they approach the second stage of their growth, and stay in the moist soil underneath for some time.

But on the farm it is impossible to remove the manure from the premises twice a week. It may be stored in fly-tight pits or bins so constructed as to be easily filled and easily cleaned. The lid must be kept closed except when the stables are being cleaned. The disadvantage here is that the manure is often contaminated before removal from the stable, and the flies can then develop and escape. If the farmer had time, the manure could be removed every morning and spread thinly over the land to be fertilized so that it would dry quickly. In this way the fertilizer would have its maximum strength.

Chemicals Found Effective.

But the usual way is to remove the manure and leave it in heaps near the

stable. How can fly breeding be prevented under these conditions? In two ways. The first is to treat the manure with chemicals which will destroy the fly eggs. Two such chemicals have been found which are effective in killing maggots, are inexpensive and do not destroy the fertilizing quality of the manure—hellebore and powdered borax.

The hellebore is most effective as a solution sprinkled over the manure heap at the rate of 10 gallons to 10 cubic feet of manure. Make the solution by adding one-half pound of hellebore to 10 gallons of water, stir and let stand for 24 hours before using. The only objection to the use of hellebore is the possibility of poisoning farm animals should they have access to the solution in the barrel or tank where it is stored. Chickens were not injured from pecking in the treated manure, however.

Powdered borax is not poisonous and is easily transported and handled. It also gives best results in solution, a minimum of 0.62 pound per eight bushels of manure, or about one pound to 16 cubic feet being necessary. Borax not only kills the larvae but prevents the eggs from hatching as well. Large amounts of borax have been found injurious to plants fertilized with treated manure, but when the borax was used in the amount given no harmful effects were noted.

Maggot Trap Built.

The second method is the maggot trap wherein the manure is thrown

on a platform of closely placed slats built over a water-tight cement base which is flooded with water. The larvae start to crawl out of the manure, drop into the water and are drowned. The cement floor should be lower at one corner, so that it may be drained and cleaned occasionally. A platform 10 by 20 feet has been found quite satisfactory.

All these preventative methods just given apply to the farmer rather than to the housewife, but it will usually devolve on the housewife to furnish the incentive to act to her husband. They are given that she may have real constructive measures to meet the problem. The woman can, with care, keep her house free of flies, but the farmer can keep the number down to a small minimum. If all the farmers in the community can be aroused to the necessity for co-operation in the matter, then, and then only, can the fly menace be done away with. It is up to the housewife, who realizes the danger, to bring the matter before her neighbor housewives, so that all may do their part and get their respective "hubbies" to do likewise. This is early in the year, but that's just the time to begin the campaign, before the fly does!

Rags for Bandages.

KEEP all scraps of white linen or other soft white material and when washed put in a sterilized fruit jar. Keep the lid on and you will always have clean bandages for cuts and bruises.

Apple Desserts

AGAIN we come back to apple desserts—we had them the very first time this department appeared—and now again. But there are so many delicious things to be made of apples that we could have them many times and not exhaust the list. Most apple desserts are simple and easily made and that's an advantage to the farm housewife. Then, too, all of them are made from things usually kept on hand. No need for a shopping trip before making an apple dessert.

Cinnamon Apple.

Select nice large apples, wash and cut in halves. Pare. To each apple of medium size—
3 T. sugar. ¼ c. boiling water.
2 T. flour. ¼ t. cinnamon.
1 T. butter. Speck of salt.

Mix sugar, salt, flour and cinnamon and sprinkle the apple, which is placed in a pan skin down. Dot with butter and over all pour the boiling water. Bake.

Scalloped Apples.

2 c. good cooking apples. 2 T. lemon juice.
6 T. sugar. 1 c. bread crumbs.
¼ t. each nutmeg and cinnamon. 1½ t. fat.
4 T. water.

Melt the fat, add the crumbs. Oil a baking dish. Cover the bottom with crumbs. Have the apples pared and sliced into thin pieces. Arrange the apples on the crumbs and sprinkle with sugar, spices, lemon juice and water. Cover with the rest of the crumbs and bake until the apples are done, about 15 minutes.

Apple Rolls.

Mix 2 c. of flour, 4 t. baking powder and ½ t. salt, using a fork for the mixing. Add ¼ c. water and roll in oblong shape on a board. Spread with 4 apples sliced thin and dust with ¼ c. sugar and some cinnamon. Roll as for jelly roll and bake.

Apple Fluff.

¾ c. apple pulp (cooked, dried or fresh and run through a sieve).
¾ c. cream.
½ c. cooked raisins.
½ c. chopped nuts.
1 T. gelatin (soaked in ¼ c. cold water and melted).
1 egg white, well beaten.

Mix gelatin, cream, pulp and allow to partly set. Whip with wire whip, and whip in well beaten egg. Add the nuts and raisins last.

Peerless Baked Apple.

1 apple. 1 t. butter.
1 t. jelly. 4 T. water.
2 t. sugar.

Wash and pare apples. Remove core, being careful not to cut through blossom end. Place in baking dish. Fill cavity in apple with jelly, sugar and butter. Add water in dish. Bake in hot oven, basting frequently with liquid in the dish.

Dried Apple Cake.

1 c. dried apples 1 egg.
cooked until 3½ c. flour.
plump. 1 t. soda.
1 c. molasses. 1 c. sugar.
½ c. butter. 1 t. cloves.
1 c. buttermilk. 1 t. nutmeg.
1 t. cinnamon.

Cook molasses and apples till thick. Cool. Mix the cake batter as usual for butter cake and add apple mixture. Bake 30 minutes in moderate oven.

Apple or Prune Souffle.

3 T. flour. 3 eggs with yolks
2 T. fat or oil. and whites beat-
¼ t. salt. en separately.
¾ c. hot apple pulp. ¾ c. water.
3 T. sugar.

(To prepare the pulp—Steam 3 or 4 large apples until soft, mash through a strainer.)

Melt the fat, add the flour, water, salt, apple pulp and sugar, and make as in white sauce. Cook 10 minutes.

Cool to lukewarm and fold in the well beaten egg yolks. Lastly blend in the whites. Turn into a buttered baking dish and set in a pan of hot water to bake. Bake until firm throughout, and a silver knife has a clean surface when plunged into the souffle. Serve with a lemon or custard sauce.

Apple Sherbet.

1½ c. orange juice. 2 t. gelatin.
2½ t. lemon juice. 2 c. water.
2 c. apple pulp. 1 t. vanilla.

Make syrup of water and sugar. Soak gelatin in cold water and dissolve in syrup. Mix all the ingredients and freeze in usual way.

Baked Apples.

Wash and core apples and place in a baking pan. Fill cavity with sugar and add a small amount of nutmeg and butter. Put a little water in the bottom of the pan and bake until apples are soft. More water and sugar may be added and the syrup thickened with cornstarch. This may be poured over the baked apples when served.

Baked Apples With Fruit Dressing.

Bake apples in usual way. Make syrup of 1 c. water, ½ c. honey and juice of 1 lemon and 1 t. grated rind. Add 4 T. chopped raisins, 4 chopped nuts and 4 chopped dates.

Simmer for one-half hour on back of stove. When the apples are done put in glass dishes and fill cavity with the fruit and pour the syrup over.

Southern Apple Pone.

1 apple. ¼ t. salt.
¼ c. milk. 1½ t. molasses.
8 T. cornmeal. 2 T. suet.

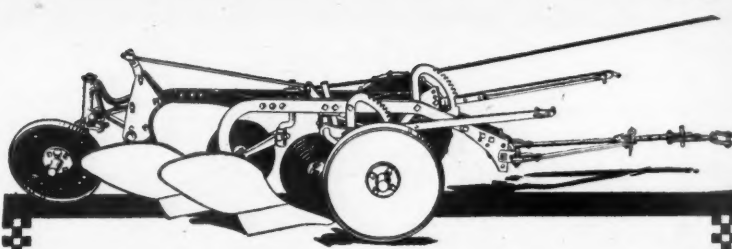
Pare and core the apple. Place in pudding dish. Scald milk and add the cornmeal, cooking it several minutes. Add salt, molasses and finely chopped suet. Pour over the apple and bake slowly one hour.

Apple Fritters.

4 large tart apples. ¼ t. salt.
1½ c. flour. ¾ c. milk.
2 t. baking powder. 1 egg.

Mix and sift the flour, salt and baking powder, add the milk gradually and the egg well beaten. Then add the apples, pared, cored and cut up quite fine. Drop from a teaspoon into deep fat and fry until golden brown. Drain and serve hot with or without syrup. The fat is the right temperature for fritters when a cube of bread dropped in the fat will brown in one minute.

c = cup.
t = teaspoonful.
T = tablespoonful.
All measures are level.



And Now His Orchard is Healthy Again—

For several years the twelve-acre apple orchard of F. R. Davis, "Sun-Kissed Fruit Farm," Casnovia, Mich., had been in sod.

The Trees Looked Yellow

"I felt that I had set my orchard back at least three years by not working the ground," says Mr. Davis. "Any orchard must be fed, and the most natural way to do this is to plow under the feed (cover crops) and work it into the soil."

He Bought a "45-A"

Mr. Davis bought the John Deere No. 45-A, the low, narrow orchard plow for use with small tractors. He plowed his orchard thoroughly, under the low limbs up close to the row. And now his trees are healthy again.

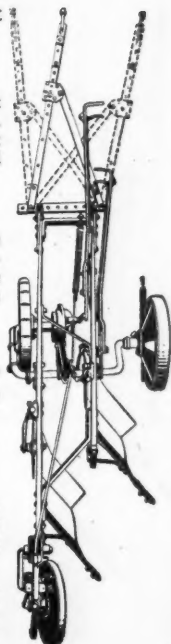
He's Satisfied

"The No. 45-A will not tip over on the turns," says Mr. Davis. "It pulls easy, does a clean piece of work, and is surely satisfactory with us."

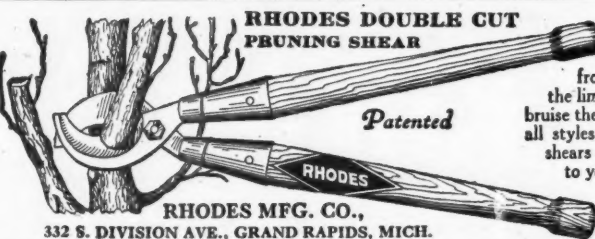
Every Orchard Needs a John Deere No. 45-A

Turn under cover crops. Feed the soil. Plow deep or shallow. The "45-A" is only 26 inches high, when plowing six inches deep; only 37 inches wide; no projections—gets under low limbs up close to row. Hitch adjustment permits setting plow out to right or left of tractor for plowing close, throwing either to or from the row.

WRITE TODAY for further information on this popular orchard plow. Remember, it also does excellent work in field plowing. Just the plow you need for your small tractor. Address John Deere, Moline, Illinois. Ask for Folder DA-51.



JOHN DEERE
THE TRADE MARK OF QUALITY MADE FAMOUS BY GOOD IMPLEMENTS



RHODES DOUBLE CUT PRUNING SHEAR

Patented

RHODES MFG. CO.,
332 S. DIVISION AVE., GRAND RAPIDS, MICH.

THE only pruner made that cuts from both sides of the limb and does not bruise the bark. Made in all styles and sizes. All shears delivered free to your door. Write for circular and prices.

Coupon
Send Before Feb. 29th.

Name.....
Town.....
Route..... State.....
We have..... acres in fruit. (17)

February Special

Farm & Home..... 1 yr. } All for
Beautiful Womanhood..... 1 yr. } \$1.00
American Fruit Grower..... 2 yrs.

USE THE COUPON
Send your remittance to
American Fruit Grower Magazine
53 W. Jackson Blvd. Chicago, Ill.

Apollo

Roofing Products

Metal makes the most satisfactory roofing for farm buildings or city construction.

APOLLO-KEYSTONE Copper Steel Galvanized Sheets are unequalled for Culverts, Tanks, Silos, Roofing, Siding and all exposed sheet metal work. Look for the Keystone added to brand. Sold by leading dealers. KEYSTONE Copper Steel is also superior for Roofing Tin Plates. Send for "Better Buildings" booklet.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.



"I'm Building for My Boys, Dad"

You are building for the future when you fence with Long-Bell Creosoted Yellow Pine Fence Posts. They'll stand firm and strong during your lifetime and keep on serving your sons.

Long-Bell

Creosoted Yellow Pine Fence Posts

are treated full length with Creosote (Dead Oil of Coal Tar) by the pressure-vacuum process, making them resistant to decay and fire. First cost is practically the only cost.

Get Money-Saving Facts! Write for further information about these posts that save money, time and work. Sent Free!

The Long-Bell Lumber Company
305 R. A. Long Building Kansas City, Mo.

THE LONG-BELL LUMBER COMPANY
305 R. A. Long Building
Kansas City, Mo.

I want to save money on Fence Posts. Without obligation to me, please send me Free Descriptive Literature.

Name

Address

My Farm Contains.....Acres ☐ Own My Farm ☐ Please Rent My Farm ☐ Check

Made in Full Round, Sawn Halves and Sawn Quarters. Ask Your Retail Lumberman!

Importance of the Male in Poultry Breeding Flock

by H. A. Bittenbender

IT WAS only a few years ago that very little attention was ever given to the chickens on the average farm. There were very few poultry breeding establishments where pedigreed males could be secured. Today we find that some thought is being given to the majority of the poultry flocks. Without doubt, more attention has been paid to the selection of the females. The male, however, is one-half of the flock and should be given the same careful consideration as the females.

Breeding.

It is the ambition of every poultryman to have a flock of hens that will average 200 eggs or more per bird. In order to achieve this enormous average, it is necessary to most carefully select and to breed from the very best individuals in the flock. The birds must be housed in the very best type of house, and the up-to-date principles of feeding must be used in order to get maximum results.

The average production per hen is further below 100 eggs than it is above. Considerable improvement can be made by the proper selection of males. Where possible, it is best to purchase pedigreed male birds where the ancestry is known. However, it is impossible for everyone to purchase male birds from trappened hens. The writer hopes to point out a few basic principles of selection which have proved to be beneficial.

Selection of Males.

Constitutional vigor coupled with masculinity and maturity forms the real basis for selection.

Physical Strength.

Head—Short, broad and deep.
Beak—Short, stout, broad and well curved.
Eyes—Bright, alert and prominent.
Comb—Red in color, well developed in size.
Body—Broad, uniform in width, especially across the back.
Breast—Full and well developed.
Legs—Stout, placed directly beneath the bird, knee or hock joints wide apart.
Toes—Straight and toe nails well worn.

Physical Weakness.

Head—Long, narrow and lacking depth from top to base of beak; nostrils small and elongated.
Beak—Long, straight and pointed.
Eyes—Dull and sunken.
Comb—Undeveloped and often pale.
Body—Narrow, especially through back; lacking in depth.
Breast—Undeveloped and sharp.
Legs—Long and stilt-like or bending at hocks, giving the bird a squatting appearance.
Toes—Long. Toe nails sharp.

Masculinity can best be determined by the activity and general appearance of the bird. If strong and masculine, he will be fearless, not necessarily pugnacious, but he will be willing to take his part in any scraps.

Coupled with masculinity comes maturity. The bird will develop in all sections, showing full plumage, and he will nearly always present a good appearance, while the bird lacking in maturity will usually be slow in development and awkward in appearance. Perhaps the head is the best indicator of the masculine development of the male bird. Those birds that have the greatest masculine development will have comb and wattles well developed in size and fiery red in color, while a bird lacking in masculinity will show less color in the head and slower development of comb and wattles.

The bird of lesser masculinity is more apt to be a coward, whipped and driven to the corners. However, the cowardly attitude of a male bird should not be used as a sole means of discarding a male. Oftentimes I have seen male birds that were strong and vigorous and of good type and conformation through some cause or other become whipped and trampled. Perhaps several birds at one time happened to pick on this particular bird and simply broke him down until he was afraid. Yet when he was separated from the rest of the males he proved to be an exceptionally good bird. All factors should be taken into consideration when a selection is made.

Males showing physical weaknesses, particularly those of conformation, should be put on the market. A male that grows too slowly very rarely is capable of transmitting high egg production. Reasonable early maturity in males is to be desired the same as in females. We want to get our broilers on the market early, and we want to get our pullets to come into laying before cold weather. Therefore, it is essential that the males should carry reasonably early maturity. Size, however, should not be sacrificed for early maturity. Quality must be kept in mind at all times. A male with heavy coarse shanks and a coarse meaty head is not to be desired.

Particular attention should be paid to the standard type of the breed and the color of the variety. While feathers do not necessarily mean eggs, it is necessary to follow a certain standard of selection. Wherever possible, it is best to follow as closely as possible, the requirements laid down by the American Poultry Ass'n in the Standard of Perfection. In no case is it advisable to use disqualified birds. Some of the general disqualifications found in the American Standard of Perfection that should be kept in mind are: Stubs or down on shanks, feet, or toes of breeds with unfeathered shanks, or indications that they have been removed; more or less than the required number of toes; deformed beaks; decidedly wry tails; crooked backs; lopped combs, except in Mediterranean, Continental and Corking females; combs foreign to the breed; split combs; side sprigs or sprigs on all single-combed varieties; decidedly squirrel tail.

It is advisable for everyone breeding standard bred chickens to have a copy of the American Standard of Perfection to properly make selections for standard type and color. It should always be kept in mind that first of all the male bird should possess vitality, constitutional vigor and masculinity.

Notes on Spray Machinery

(Continued from page 43.)

THE AIR CHAMBER.

All properly equipped spray outfits now carry an air chamber and the function of this part is to equalize the pressure and the flow of liquid to the nozzle. These chambers are usually made of heavy cast steel and should be of good size and tested to withstand the high pressures now in use.

AGITATORS.

An outfit which does not have a good agitator would certainly be most unsatisfactory to the grower. Agitation may be secured in power sprayers by the propeller type, which is located near the bottom of the tank. Two or three wings or blades are provided for each propeller, and one propeller may be found at each end of the tank. Some outfits are geared to run the agitator at 100 revolutions a minute, but the speed should depend on the size and the arrangement of the blades. One or two makes of outfits are equipped with a paddle type of agitator. Two wooden strips are attached to an extension from the steel agitator shaft. These strips are nearly as long as the tank and revolve slowly with the shaft, churning the material thoroughly and passing within an inch of the bottom of the tank. This type is very efficient, and may be found on two makes of sprayers.

In general, the requirements for a (Concluded on page 53.)

Kill Aphis

This tiny, destructive insect causes dwarfed fruit and culls and is one of the great foes to orchard profits. "Black Leaf 40," the "old reliable" nicotine spray, rids your trees of Aphis, Red Bug, Pear Psylla, Thrips, and other ruinous insects. Equally effective in combination with other standard sprays and saves labor by combining two protective measures. Agricultural Colleges and Experiment Stations recommend it.

Your Dealer has "Black Leaf 40" and new leaflets.

TOBACCO BY-PRODUCTS & CHEMICAL CORP.
Incorporated
LOUISVILLE, KY.

Spray
Black Leaf 40
40% Nicotine **kills Aphis**



Timeliness in Apple Scab Control

(Continued from page 44.)

spring rains, discharge the spores into the air to be caught up by the wind and blown about (Fig. 3 E, F). This ripening of the spores of the winter stage, in general, keeps pace with the onset of spring and is "timed" to occur just as the blossoms push out of the swollen buds.

The spores shot by the sacks into the air and caught by the air currents are carried here and there and some reach the strap-like first leaves and some reach the blossoms themselves. Here they sprout in films of water and bore into the apple tissue. After about a week—the time varies with the temperature—the fungus goes to seed—produces a crop of spores (Fig. 3 A). These spores are produced in abundance, literally thousands developing from a single infected area. These spores are shed and again blow about the trees. The spores sprout (Fig. 3 C) when the leaves are wet and bore into the leaf or fruit. Once inside, the fungus produces a typical scab spot, perhaps an eighth of an inch in diameter. In a week after infection, the fungus goes to seed again and produces its thousands of spores. These again blow about the trees, re-infect and produce their seed. The time from spore to spore is only a week, and increasing as the scab does a thousand fold at each generation, it is evident that in a month the fungus can so entrench itself that every leaf and fruit is scabbed.

Note that the fungus starts small but such are its powers of reproduction that it can augment itself a thousand fold. Note also the sharp dependence of the scab upon the weather for its development. The winter spores are only discharged when the leaves are wet, and infection takes place only when there is a film of water on the leaves or developing fruit in which the spores (seeds) can sprout. Think back over last season and the reason for the freedom from scab can readily be explained—last season started with an unprecedented drought at the time when the apples were blossoming and which continued for some weeks after. The dry weather prevented apple scab getting its usual early and destructive start.

Control of Scab by Spraying.

Now we must apply these facts to the matter of control by spraying. We are fighting a parasite which starts in the spring from fallen leaves. The less scab there is on the leaves—the cleaner the ground under the trees—the less scab there will be. Scab is chiefly to be prevented, however, by putting on a protective coat of spray which will kill the scab organism before it gets itself buried out of reach in the apple tissue.

Control of scab hinges upon finding the vulnerable points for attack, for we must recognize that the spray application can ward off scab, not cure it after infection has taken place. It is evident therefore, that the critical thing in apple scab control is to spray at the right time. The right time is just before the discharge of the winter spores. How can the fruit man determine this? For the last few years fallen leaves have been obtained weekly from apple growing centers and these have been examined microscopically at the Michigan Agricultural College Experiment Station. For each state similar service is rendered by the various state experiment stations. When spores are found to be mature, press notices advising prompt application of sprays are sent out in order to have the protective coat on before the next rainy period. In Michigan the notice is sent to each county agent as the critical date is determined or approximated for his locality and he is in position to relay the information which the fungus itself gives about spraying.

Delayed Dormant or Pre-pink Spray Advised.

In these studies we have noticed
(Concluded on page 58.)

Plant in blasted holes—the yield will show you why



THERE'S every common-sense reason for planting trees in blasted holes—and the proof of them all is in the yield.

In suitable soil this method never fails to produce hardier, thriftier trees, with consequently greater yields. *Trees planted in blasted holes also bear a year earlier.*

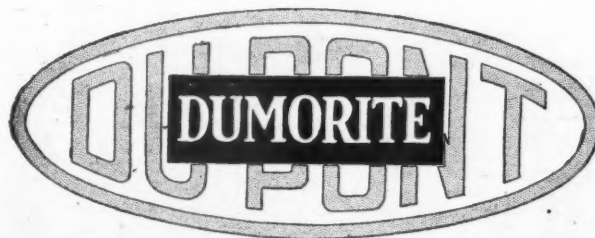
When you get ready to plant — ask your du Pont dealer to estimate your requirements of Dumorite, the new du Pont dynamite that "does more" and costs less.



Dumorite shoots stick for stick with 40% dynamite. *But you get 1/3 more of it for every dollar you spend.* It won't freeze and won't give you a headache from handling.

Write us for our valuable "Farmers' Handbook of Explosives" — free to every farmer and orchardist.

E. I. DU PONT DE NEMOURS & CO., INC.
Explosives Department
WILMINGTON, DELAWARE



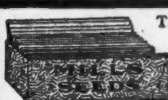
Branch Offices:

Birmingham . Ala.
Boston . Mass.
Buffalo . N. Y.
Chicago . Ill.
Denver . Colo.
Duluth . Minn.
El Paso . Tex.
Huntington . W. Va.
Kansas City . Mo.
Mexico City . Mex.
New York . N. Y.
Pittsburgh . Pa.
Portland . Ore.
St. Louis . Mo.
San Francisco . Calif.
Scranton . Pa.
Seattle . Wash.
Spokane . Wash.
Springfield . Ill.

Du Pont Products Exhibit
Atlantic City, N. J.

Subscribe to the American Fruit Grower Magazine : Three Years for \$1.00

BOX OF SEEDS—10c



This is a Wonderful Box of Seeds and will produce bushels of Vegetables, Fruits and Flowers.

The following 10 Packets of Seeds will be mailed to any address for only 10c:
1 Pkt. (300 seeds) Cabbage—50-day—Produced heads in 60 days.
1 " (500 ") Lettuce—Earliest or 12-day—Record breaker.
1 " (100 ") Radish—Red Bird—Earliest of all reds.
1 " (100 ") Vegetable Peach—Fine for preserving.
1 " (1000 ") Turnip—6 Wks. or Snowball—Quickest grower.
1 " (100 ") Tomato—Early Tree—best of all Erect growers.
1 " (25 ") Garden Berry—Fruits in 4 months from seed—good for Preserves and Pie.
1 " (50 ") Aster—Bonquet—1 plant is a gorgeous bouquet.
1 " (1000 ") Poppy—Firefly—Most gorgeous poppies grown.
1 " (2000 ") Flowers—27 varieties—Great mixture—Wonderful colors.

I Guarantee you will be more than pleased. New 1924 Seed Book of the best Vegetable and Flower seeds, many Novelties in Colors, free to all. Order today.
F. B. MILLS, Seed Grower, Box 30 ROSE HILL, N. Y.

Most Delicious Grape the CACO

Pronounced by many as equal in quality to finest hot house varieties. Hardy, easily grown. Large, wine-red. Good size bunches. Ripens 10 days to 2 weeks before Concord. Price: 2 yr. No. 1 plants 65c ea; 10 for \$6; post-paid.

FREE BOOK on "Trees and Seeds That Grow." Different. Full of planting information! Very low prices. Send name and address on postal today.

SONDEREGGER NURSERIES & SEED HOUSE
Carl Sonderegger, Pres. 226 Court St., Beatrice, Neb.

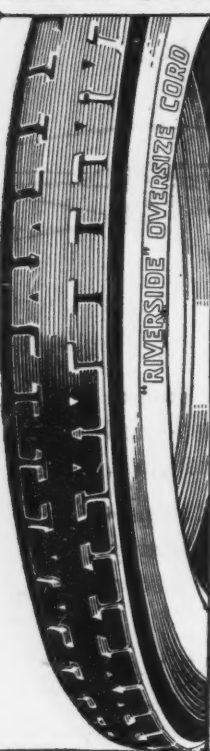
71st YEAR PRICES LOW

Plant Fruit Trees That Grow
Fruits bringing higher prices than ever. All standard varieties. Shade and ornamental trees, shrubs, hedges, plants, vines. Best quality. Every customer MUST be satisfied. Write today for free catalog.
Box 61 SPRING HILL NURSERIES
Tippencanoe City (Miami Co.) Ohio.

SEEDS FREE CATALOG

10,000 miles guaranteed and yet you save 1/3

Riverside OVERSIZE CORD Tires



Riverside Oversize Cord Tires are guaranteed for 10,000 miles and in actual performance give up to 18,000 miles. Can any other tire do more?

So why not save one-third and use Riverside Cords? What more will any other tire do? Then why pay more?

And this 10,000 miles service is backed by a guarantee that has stood for fifty-one years. Does any other tire carry a better guarantee?

Quality is built into Riverside Cords

This guaranteed mileage is built into Ward's Riverside Cords. High treads, thicker and stronger, of tough, live rubber.

This exceptional quality of Ward's tires alone has made us the largest retailers of tires in the country. The tires themselves have convinced thousands that Riverside Cords are best.

You Don't Risk One Cent

Before you buy any tires send for Riverside. Inspect them. Compare them with tires selling for \$5.00 or \$15.00 more.

Send them back if you do not find them the equal of any first-quality oversize cord made. We will refund your money. These prices buy 10,000 miles of service—and more.

CATALOGUE No. 464M00—Be sure to give size.

SIZE	PRICE	POSTAGE	SIZE	PRICE	POSTAGE
30 x 3 1/2	\$ 9.75	28c	32 x 4 1/2	\$20.95	45c
32 x 4	16.95	42c	34 x 4 1/2	21.95	48c
33 x 4	17.45	43c	33 x 5	28.75	58c
34 x 4	18.25	43c	35 x 5	29.95	61c

"I have used two Riverside Cords on the rear wheels of my car for two years. They have gone over 12,000 miles now and have never been off the wheels and they still look new."
August Wm. Schultz
R-66-83
Van Horn, Iowa

Wire your order. Orders received by telegraph will be shipped the same day C. O. D.

Free Write today to our house nearest you for free Auto Supply Book. Address Dept-73-T



Montgomery Ward & Co.

Chicago Kansas City St. Paul Portland, Ore. Oakland, Cal. Ft. Worth New York Atlanta, Ga.

Yes We Sell NITRATE OF SODA

We Also Sell Other Fertilizer Materials for use alone or for Home Mixing

Write for Prices NITRATE FERTILIZER CO. 408 Central Bank Building, Columbus, O.

STRAWBERRIES

Dixon Quality Plants are big money makers; sure to grow and produce large luscious berries all season. 35 years in business guarantees quality. FREE PLANT BOOK. Tells variety, how and when to plant and how to make big money growing berries of all kinds if you buy Dixon Quality Plants. Send name today.

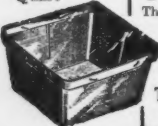
F. W. DIXON, Dept. 24, Holton, Kans.

SPRAYS: Lime-sulfur, \$8 barrel. "KILTO" (apple-potato-trunk spray), Lead and Calcium Arsenate, Bordeaux, etc. Agents wanted, order now. W. A. ALLEN Pittstown, N. J.

FREE WRIST WATCH

Handsome, guaranteed time keeper, given for selling only 40 packs of vegetable or flower seeds (mention which) at 10c per large pack. Easily sold—EARN BIG MONEY OR PREMIUMS. Get sample lot today. Send no money. We trust you will send no money. Box A-1, AMERICAN SEED CO., Lancaster, Pa.

The BERLIN Quart



The White Basket

That secures highest prices for your fruit. Write for catalog showing our complete line, and secure your baskets and crates at FACTORY PRICES AND WINTER DISCOUNTS.

The Berlin Fruit Box Co. Berlin Heights, Ohio

Hundreds of satisfied users have discarded old methods of spraying in favor of AEROLIZING with the TIRRELL AIR SPRAYER, which aerolizes the solution by impregnating with compressed air. Drives the Foglike Mist into foliage and coats without drenching. Does a thorough job quickly without break-downs—hits the highest places economically. The TIRRELL AIR SPRAYER impregnates solutions with millions of tiny air bubbles, preventing spray burn, abrasions and penetration of strong solutions into the vital lungs of trees and under the skin of fruit. Tests by experts and their unqualified endorsement of the TIRRELL AIR SPRAYER is your safeguard. Play safe—economize—get better results—AEROLIZE! Write for descriptive catalog. There is a TIRRELL for every purpose.

TIRRELL MFG. CO., Bridgman, Mich.



- No. 1937. Long-Waisted Dress. Cut in sizes 16 years, 36, 38, 40 and 42 inches bust measure. Size 36 requires 1 1/2 yards 36-inch material with 2 yards 36-inch contrasting.
- No. 1861. Diagram Explains Simple Construction of This Dress. Cut in sizes small, medium and large. The medium size requires 2 3/4 yards 40-inch material with 3/4 yard 36-inch contrasting.
- No. 1859. Dress for the Older Woman. Cut in sizes 36, 38, 40, 42, 44, 46, 48 and 50 inches bust measure. Size 36 requires 3 3/4 yards 40-inch material with 4 yards of binding.
- No. 1164. Sailor Suit for Small Boys. Cut in sizes 2, 4, 6 and 8 years. Size 4 requires 1 1/2 yards 36-inch material with 5/8 yard braid.
- No. 1863. Neat Apron. Cut in one size and requires 2 3/4 yards 27-inch material with 9 yards edging.
- No. 1951. Becoming One-Piece Dress. Cut in sizes 16 years, 36, 38, 40, 42, 44, 46, 48 and 50 inches bust measure. Size 36 requires 3 3/4 yards 40-inch material with 3/4 yard 36-inch contrasting.
- No. 1867. Panty Frock. Cut in sizes 2, 4, 6 and 8 years. Size 4 requires 2 yards 36-inch material with 3/4 yard 36-inch contrasting.
- No. 1639. Neat House Garment. Cut in sizes 34, 36, 38, 40, 42 and 44 inches bust measure. Size 36 requires 4 3/4 yards 36-inch material.
- No. 1949. Pretty Blouse Style. Cut in sizes 16 years, 36, 38, 40, 42 and 44 inches bust measure. Size 36 requires 1 1/2 yards 40-inch material with 1 yard 23-inch contrasting and 2 3/4 yards trimming.
- No. 1893. Slip. This can be made with built-up shoulders or with straight upper edge. The pattern cuts in sizes 16 years, 36, 38, 40, 42, 44 and 46 inches bust measure. Size 36 requires 2 3/4 yards 36-inch material.

ORDER BLANK FOR PATTERNS—Price 10 cents each.

PATTERN DEPT., AMERICAN FRUIT GROWER MAGAZINE
53 W. Jackson Blvd., Chicago.

Enclosed find.....cents for which send me the following:

Pattern No.....Size.....Pattern No.....Size.....

Name.....Address.....

Postoffice.....State.....

MAKE MORE MONEY!

\$3,000 PROFIT IN 4 MONTHS!

CRISPETTES



GEORGE ALEXANDER of Pennsylvania made \$3000.00 in 4 months making and selling CRISPETTES with this outfit. (Nov. 7th, 1923). Jacob Gordon, New Jersey, (November 2nd, 1923), says: "Profits over \$4000.00 in 2 months!" Mesner of Baltimore \$250.00, in one day! M. I. Croien, Ohio, (November 3rd, 1923), writes: "Doing big business—sold over 200,000 packages Crispettes last year". Mrs. Lane, Pittsburgh, says: "Sold 8,000 packages in ONE day".

We Start You In Business

Crispettes easy to make, easy to sell. We furnish everything—complete outfit, secret formulas, raw materials, full directions, wrappers, etc. No experience needed. Little capital starts you on road to wealth. Open a retail store of your own. Sell wholesale to groceries, drug stores, etc.

Build a Business of Your Own

Crispettes sell fast everywhere. Everybody likes them. They're a delicious confection. We'll tell you how to build a business of your own. Start now, in your town.

Profit \$1,000 a Month Easily Possible

Send for illustrated BOOK OF FACTS. Tells how many people in small towns and big cities are making big successes of Crispette Business. Shows how, when and where to start. Full of valuable information. It's FREE. Write now. Postal brings it.

LONG BAKINS COMPANY
262 HIGH STREET SPRINGFIELD, OHIO

Hotel Tuller
DETROIT

800 Rooms 800 Baths

Headquarters for
Detroit Automobile Club
Old Colony Club

Daily Rates Single: \$3.00 Up

Visit our New Arabian Restaurant
and Gothic Grille

C. C. SCHANTZ, Gen. Mgr.
Cafe — Grille — Cafeteria

BOLENS POWER HOE
and Lawn Mower
Tractor



It seeds, it cultivates, it mows the lawn. It supplies power for operating light machinery. The BOLENS has a patented archaic for clearance and tool control for accurate guidance in close weeding and cultivating. A differential drive makes turning easy. All attachments have snap hitches and are instantly interchangeable. A boy will run it with delight. Send for full particulars. 309 Park St., GILSON MFG. CO., Port Washington, Wis.

The New Improved Walsh **NO-BUCKLE HARNESS**



\$5 After 30 Days Trial

Send for my big new free harness book. Tells how I send Walsh No-Buckle Harness on 30 days free trial. Use it—prove for yourself that it is stronger, easier to handle. Outwears buckle harness because it has no buckles to tear straps, no rings to wear them, no buckle holes to weaken them. Amazing success—thousands in use in every state.

Costs Less—Wears Longer

Saves repairs. Walsh special 900 steel test leather, which is explained in big free book. Easily adjusted to fit any size horse. Made in all styles: back pad, side backer, breeching, etc. \$5 after 30 days trial—balance is paid monthly. Return to me if not satisfactory. Write today for my big free book, prices, easy terms. Sold direct to you by mail only.

J. M. WALSH, Pres.
WALSH HARNESS CO.
122 Keefe Ave., Milwaukee, Wis.

Send For Your Copy

Phoma Fruit Spot of Apples

(Continued from page 28.)

develop later into typical Phoma fruit spots. This development of spots under cellar storage and delayed storage conditions might give the impression that the disease spreads in storage, but this is not the case. The new spots that appear in storage are the results of orchard infection and not of a spread of the disease from one apple to another.

Control.

Phoma fruit spot is not difficult to control, yet it often causes considerable loss in orchards that have received relatively good care. The real difficulty lies in the fact that the disease is so susceptible to weather conditions and so erratic in its occurrence that control measures are often neglected. If the disease has not been serious for a few years, the losses from it are somewhat forgotten, and if June and July are showery, the orchard program is likely to become too crowded to include any work of questionable value. The result follows that midsummer sprayings are omitted in the very year that they are most needed.

The Phoma fruit spot has a long incubation period and it is somewhat difficult to determine when infection actually occurs. Apparently the apples are never infected before the middle of June and probably seldom, if ever, before the first of July, and the infection period may continue into August.

In dry seasons the calyx spray and the application three or four weeks later may be of some value in holding Phoma fruit spot in check, but they should never be relied upon for complete control. Where the disease is of sufficient importance to receive special consideration, a thorough spray application should be made eight or nine weeks after the calyx spray. This one application is usually sufficient to secure practically complete control, but if the weather is showery it may be advisable to follow it with another a few weeks later. Orchards that are sprayed for blotch and bitter rot do not require other treatment for Phoma fruit spot.

Bordeaux mixture gives excellent control of the disease and lime-sulphur combined with arsenate of lead gives practically as good results. Lime-sulphur alone sometimes fails to hold the disease in check. Very satisfactory results have been obtained with double strength arsenate of lead without the addition of sulphur or copper or other fungicidal material. The spreading and sticking qualities of the spray material are important factors in the control of the disease.

In spraying for Phoma fruit spot, it should be borne in mind that the blossom half of the apple is especially susceptible to the disease. Sprays that are directed downward on the tree from a tower are not likely to give the blossom areas a good covering, and if the foliage is heavy, entire apples may escape treatment. Sprays that are directed upward from the ground are much more effective. Very thorough results can be obtained by using an angle nozzle, extending the nozzle into the center of the tree to throw the spray upward and outward and making sure that all fruit surfaces are covered.

Notes on Spray Machinery

(Continued from page 50.)

good spraying machine are that it should be as light as possible so as to be conveniently handled under trying working conditions, as on hilly or soft ground. It should be constructed with a minimum number of parts requiring attention, and so placed that they may be easily repaired or replaced when necessary. The outfit must be built strongly enough to withstand the ordinary emergencies in the field. Strength and durability should not be sacrificed for the sake of lightness, but when the three are consistently combined, a very important phase of manufacture has been accomplished.

The Farmer's Interest In Good Railroad Service

FARMERS must have good and adequate railroad service. When they cannot get enough freight cars they suffer heavy losses.

The railways are making tremendous efforts and large investments to improve their properties and increase locomotives and cars to enable farmers and other producers to ship all their products, and ship them promptly.

For some years there were repeatedly "car shortages" which made it impossible for many thousands of farmers to ship their wheat, corn, livestock and fruit when they wanted to. These conditions existed because, chiefly owing to unwise and restrictive regulation, the development of the railways had greatly declined.

How Railroad Development Declined

From 1907 to 1914 the railways bought an average of more than 130,000 freight cars each year. Freight cars, like farm wagons and other vehicles, wear out. In these years the railways "scrapped" an average of 80,000 cars a year. The average increase in the number of cars in service was 50,000 a year.

Then restrictive regulation and other causes greatly slowed down railway development. From 1914 to 1921 the average number of new freight cars bought was only 79,000 a year; the average number retired, 74,000 a year. Therefore, in these years the average increase in the number of freight cars was only 5,000 a year.

Do you wonder that when the increase in freight cars declined from 50,000 to 5,000 a year there were "car shortages"?

From 1907 to 1914 the railways bought 3,100 new locomotives a year, and "scrapped" 1,600 a year. The increase in locomotives was 1,500 a year. From 1914 to 1921 they were able to buy an average of only 1,700 locomotives a year, and had to retire 1,450. Therefore, the average increase in locomotives was only 250 a year. This was only one-sixth as great as the yearly increase up to 1914.

The production and commerce of the country were continuing to grow as before. The railways could not meet the demands made upon them because they were not able to increase their freight carrying capacity as before.

The framers of the Transportation Act of 1920 saw this decline in railway development must stop. Otherwise farmers, manufacturers, mine operators would become unable to ship their products. A paralysis of business and a great national disaster would result.

Therefore, Congress provided in the Transportation Act that the Interstate Commerce Commission in regulating rates and the "fair return" the railways should be allowed to earn must

This is one of a series of advertisements published to give the farmer authentic information about railroad matters. Any questions that you would like to ask will be cheerfully answered. Address:

WESTERN RAILWAYS' COMMITTEE ON PUBLIC RELATIONS

650 Transportation Building, Chicago, Illinois

S. M. FELTON, President,
Chicago Great Western Railway,
L. W. BALDWIN, President,
Missouri Pacific Railroad Co.
RALPH BUDD, President,
Great Northern Railway,
H. E. BYRAM, President,
Chicago, Milwaukee & St. Paul Ry.,
W. H. FINLEY, President,
Chicago & Northwestern Railway,

CARL R. GRAY, President,
Union Pacific System,
J. E. GORMAN, President,
Chicago, Rock Island & Pacific Railway,
HALE HOLDEN, President,
Chicago, Burlington & Quincy Railway,
C. H. MARKHAM, President,
Illinois Central Railway,
C. E. SCHAFF, President,
Missouri-Kansas-Texas Lines.

"give due consideration to the transportation needs of the country and the necessity of enlarging railway facilities in order to provide the people of the United States with adequate transportation."

Transportation Act Revives Railroad Development

The railways have not earned the "fair return" to which the Commission says they are entitled. The western roads earned only 3½ per cent on their valuation in 1921, 4 per cent in 1922, and 4½ per cent in 1923, although the Commission says they are entitled to 5¾ per cent.

But railway managers and investors believed Congress and the Commission meant what they said. They believed the public would support the policy of enabling the railways to earn enough to provide the public with adequate transportation.

Therefore, investors supplied and the railway managers invested over 400 million dollars in 1922 and over one billion dollars in 1923 for new cars, locomotives and other improved and enlarged facilities. The Joint Commission of Agricultural Inquiry of Congress estimated in its "Transportation" report in 1922 that the railways should invest 750 million dollars a year. This Commission was composed of members of Congress. It included Senator Arthur Capper of Kansas, leader of the farm bloc.

The railways are doing what Congress and this Congressional Commission said they should. They placed in service in 1923 almost 200,000 new freight cars, and almost 4,000 new locomotives. These new cars and locomotives alone cost almost 700 million dollars.

Freight business in 1923 was the largest in history. Mainly owing to the new equipment bought and other improvements made, the railways handled this vast business with practically no "car shortages" or serious delays. Unlike previous years of large business, the western farmers suffered practically no loss from "car shortages."

What Radical Legislation Will Do

Do the farmers want a continuance of this kind of service? Of course they do. But radical legislation is being advocated which would frighten investors away from the railways and stop the investment of new capital in them. This would stop their development and cause a return of long and serious "car shortages" and resulting heavy losses to farmers and all other producers and shippers.

Such legislation would do western farmers more harm than any other class of people because they more than any other class need good and adequate railroad service to get their products to market.

ATKINS PRUNING SAWS



Our Duplex Pruner, shown above, has two edges—one for fine cutting—other for heavier work. A very popular saw.

No. 4 Saw is handy for taking off large or awkward limbs.

No. 7 Tapered Saw with adjustable blade for sawing close to limbs.

No. 11 Tapered Saw, adjustable blade, Easy-Grip handle.

We make saws for every wood or metal-cutting purpose.

Write for booklets.

Do Better Pruning in Less Time

YOU need good saws to do your pruning properly and profitably. Use Atkins Pruning Saws. They help you do better pruning, save you time, labor and money. Atkins Saws are made of the famous "Silver Steel"—the finest saw steel in the world. They take a keener edge, cut faster, run easier and stay sharp longer with less filing.

Here are shown four popular Atkins Pruning Saws. There are others for every pruning need. If your hardware dealer hasn't the one you want, write us. Insist on an Atkins.

Get this FREE Book

Every fruit grower should have a copy. It tells correct methods and time for pruning all trees, and shows full line of Atkins Pruning Saws. Mail coupon for a copy—today.



E. C. Atkins & Co., Inc.
Dept. D-1, Indianapolis, Ind.

Makers of "Silver Steel" Saws and Tools.

Send me a copy of your book on Pruning Saws.

Name

Address

Dealer

SULPHUR

"Bergenport Brand"

FOR SPRAYING, INSECTICIDE AND DUSTING PURPOSES

T. & S. C. WHITE CO.

100 William Street

New York

FARM ENGINES

Saved \$21 ordering direct from your factory says W. Price, Ind. You will save on our reliable engine. Built to do hard, heavy work. Kerosene, gasoline. Easy to start—no crank. 11-14 to 18 H.P. 3 Months Trial. Cash, Easy Terms: 30-Year Guarantee. Free Book—How to Buy Better Engines. Write today. THE OTTAWA MFG. CO. OTTAWA, KANSAS. PITTSBURGH, PA. 1171-2 King Street. Desk 1171-2 Meigs Bldg.

OIL EMULSION 1 CENT PER GALLON—TWO gallons SPRAYING OIL costing \$1.00 makes 100 gal. Spray. A 2% emulsion—Experiment Station Formula. Write for booklet.

Distributor: Nitrate Soda — Bluestone — Sunoco Spraying Oil — Scalecide

Full line orchard supplies. We save the grower money.

S. H. BURTON, Western Distributor, Indianapolis, Ind., Washington, Ind.



This Orchard Proves the value of thorough cultivation with the

Clark CUTAWAY

California Orchard Plow

Our complete catalog describes this and other CLARK "CUTAWAY" orchard tillage implements; also the Bush and Bog Plow for subduing rough land and preparing it for orchard use. Our book,

"The Soil and Its Tillage," contains valuable information on soil culture. A post card will bring both books to you free. Mail it today.

The Cutaway Harrow Co., 14 Main St., Higganum, Conn.

Apple Blotch Control

by Max W. Gardner

Purdue Agricultural Experiment Station

ENORMOUS and unnecessary losses are suffered by apple growers in the southern part of the apple belt because of the ravages of the fungous disease known as blotch. Investigations of this disease recently carried out at the Purdue University Agricultural Experiment Station (Bul. 267) have shown that the blotch losses may be effectively prevented by certain additions to the ordinary spraying program and by certain precautionary measures not hitherto practiced.

A more intimate understanding of this disease on the part of orchardists will materially assist them in controlling blotch. In the first place, it should be remembered that blotch is much more limited in its varietal preferences than are certain other diseases, such as scab and black rot. This knowledge is particularly important to those who are about to set out a new orchard anywhere south of a line running more or less through the centers of Nebraska, Iowa, Illinois, Indiana, Ohio and Pennsylvania, because, other things being equal, extremely susceptible varieties should not be chosen.

Susceptible Varieties.

The extremely susceptible varieties are Northwestern, Oldenburg (Duchess), Missouri, Smith Cider, Mann, Maiden Blush, Benoni, Akin, Lawyer, Willow, Arkansas Black, Rome, Stark, Limbertwig, Lansingburg, Gano and Transparent. On the other hand, a high degree of resistance is shown by such popular commercial varieties as Delicious, Winesap, York, Stayman, Jonathan and Grimes.

Since the blotch fungus persists from year to year in cankers on the twigs and branches, varieties which canker badly act as carriers and harbors of infection. Blotch cankers

have been found very commonly on nursery stock of a number of varieties among those listed above as susceptible and on others as well. This brings us to a most important phase of blotch control. Much evidence has been obtained which indicates that blotch is introduced into young orchards with cankered nursery stock and it behooves orchardists to inspect carefully all of their nursery stock for the blotch cankers on the trunks or limbs and to reject infected shipments.

Cankers on Seedlings.

Furthermore, the cankers have been found abundantly on the seedlings used as stocks and nurserymen should guard against the introduction of the disease into their nurseries with such seedlings which are often purchased in large quantities. Unlike scab, blotch is primarily a water-spread disease and conditions in the closely planted nursery row are ideal for wholesale infection by this fungus. The spores ooze out of the spore-cases in the cankers during wet weather, are washed to the soil, carried by surface drainage water and splashed onto hundreds of trees, there to germinate and produce more cankers. Nurserymen should guard also against the blotch menace by taking buds only from blotch-free trees and by avoiding the use of susceptible stocks, such as Northwestern. Above all, nurserymen in the blotch belt should apply the sprays to be described later.

How Disease Is Spread.

So far we have dealt only with principles of prevention applicable to future plantings. Let us next take up the case of the owners of young plantings in the blotch region. What may be done here to guard against the



Cutting blotch cankers out of a young Duchess tree.

Boyce Double Spray Gun

Cuts Labor Cost in Half!

One man with the Boyce Double Gun does the work of two men with single guns. The two nozzles give double the volume and double the width of coverage, while retaining the extreme fineness of spray fog produced by the small-diameter opening. The operator thoroughly sprays a tree with half the motion and in half the time required with a single gun.

The Boyce combines high-class work with high speed and utmost economy. As simple and easy to adjust as any single gun, and does its work perfectly at either long or short range.

Can be used on any sprayer having a capacity of 6 gallons a minute or more at 200 lbs. pressure and up.

Insist that your new outfit be equipped with this time and money saver. For sale by dealers everywhere or shipped, prepaid, to any address in the U. S. for \$11.50.

Dealers not now selling the Boyce Double Gun should write us at once.

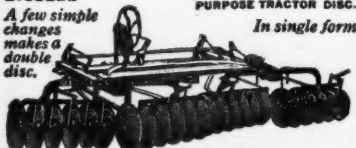
Sprayer Supply Mfg. Company
223 Front Ave., N. W., Grand Rapids, Mich.

BISSELL

A few simple changes makes a double disc.

SPECIAL ORCHARD DUAL-PURPOSE TRACTOR DISC.

In single form



With trees to right, soil is pulled away and with trees to left, soil is thrown back. Returning on same track leaves soil level as with a Double Action Harrow—Disconnect right section and attack behind left and you have a regular Double Action Harrow—A Real Dual-Purpose.

The Handy Control is equally efficient with disc in either form. There is a BISSELL for every tillage need. Write for particulars.

Mfg'd only by T. E. BISSELL CO., Ltd., Elora, Ont., Can.

Grade Your Apples—Press the Undergrades



GRADE your apples—and put your undergrades through a Mount Gilead Hydraulic Cider Press. Then you'll get the maximum amount of cider—and highest quality the apples will produce. Fine grinding and tremendous pressure accomplish this. Mount Gilead Presses are designed and built right. Leaders for half a century. All sizes. Write for booklet.

THE HYDRAULIC PRESS MFG. CO.
104 Lincoln Ave. Mount Gilead, Ohio

Mount Gilead
HYDRAULIC CIDER PRESSES

Saws Logs—Falls Trees—Slices Branches—Does Belt Work

One Man Saws 15 Cords a Day!

—Easy with the OTTAWA Log Saw! Wood selling for 25¢ a cord brings you \$45 a day. Use 4 ft. P. Saws for other work. Wheel mounted—easy to move. Saws faster than 10 men. Shipped from factory or nearest of 10 Branch houses. Write for FREE Book today.

OTTAWA MANUFACTURING CO.
1351-U Wood Street Ottawa, Kansas
Room 1351-U Magee Bldg., Pittsburgh, Pa.

ORNAMENTAL FENCE

6 Cents per Foot and up. DIRECT FROM FACTORY

Costs less than wood. Kokomo Fence Company's beautiful and protects Lawns, Churches, Cemeteries, Etc. 40 designs. All steel. Write for FREE Fence Book and New Low Prices.

Kokomo Fence Mfg. Co.
Dept. 677 Kokomo, Ind.

WRITE FOR THIS FREE BOOK

EMPIRE

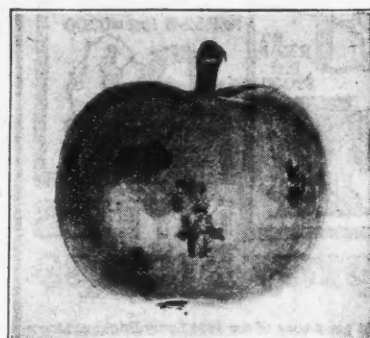
WAGONS STEEL WHEELS

Low steel wheels (plain or grooved wide tires) make loading and hauling easier. Steel wheels to fit any axle; carry any load. Make any wagon good as new. Reduced prices. Catalogue Free.

EMPIRE Mfg. Co., Box 344 Quincy, Ill.

future blotch menace? Here again another peculiarity of the fungus should be understood. There seems to be no extensive wind spread of blotch such as occurs in the case of apple scab. Blotch spreads mainly by the dripping or splashing of rain and dew and by wind-blown rain. Therefore where orchards are well separated, there seems to be very little spread from one orchard to another. Each orchard presents a distinct and separate case as far as blotch is concerned.

Furthermore, in young orchards where the small trees are as yet wide-

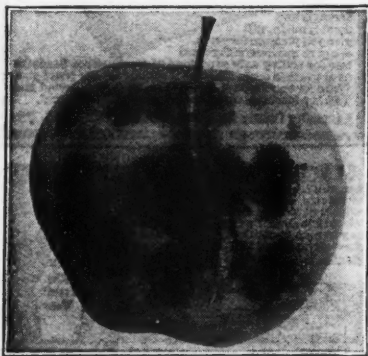


Blotch on young fruit.

ly separated, there seems to be very little spread of blotch from one tree to another. In many young orchards of susceptible varieties only a certain and often small percentage of the trees contain cankers and the indications are that these were originally infected in the nursery. Furthermore, even in old orchards individual trees of the same variety vary greatly in the severity of the disease and exhibit these individual differences year after year. Therefore one is led to the conception that the severity of the disease in an orchard depends upon the number of infected trees originally planted and the subsequent rate of formation of new cankers higher and higher in these originally infected trees year after year, accompanied by a gradual infection of the other trees.

Start the Fight Early.

If, then, in every young orchard containing susceptible varieties, blotch



Blotch spots frequently cause the fruit to crack open.

cankers are apt to be present on a certain percentage of the trees and increasing in number year after year, should not an active fight against the disease be started as soon as possible? Growers in the Vincennes region of Indiana have answered in the affirmative. Here there are extensive plantings of young Oldenburg, Transparent, Maiden Blush, Rome and other susceptible varieties, and an active campaign is being waged against the disease by applying the blotch sprays every year to prevent new cankers and by cutting all of the old cankers out of the trees now infected. The spraying will be discussed later.

In orchards set out not over five or six years, it has proved feasible to eradicate the blotch cankers by pruning out infected twigs and spurs and by shaving the cankers from the trunk and larger limbs with a sharp pocket knife. The cankers are shallow and can be removed without injury to the underlying cambium layer. All of the discolored bark should be removed



TREE TANGLEFOOT

An Absolute Protection for Fruit Trees, Shade Trees and Vineyards against Climbing Insect Pests

No climbing or creeping leaf-eating insect can cross a band of Tree Tanglefoot . . . a harmless sticky material applied in narrow bands to the trunks of shade, fruit and nut trees and grapevines.

One application remains effective three to four months, *outlasting 10 to 20 times any other known substance.*

Tree Tanglefoot has practically displaced all other tree-banding compounds wherever introduced.

A pound makes 12 lineal feet of band three inches wide. No expensive apparatus or skilled workmen are required . . . easily and quickly applied with a wooden paddle.

Especially recommended against:

Climbing Cutworms	Canker-worms
Gypsy and Brown-tail Caterpillars	
Tussock Caterpillars	Ants

For tree surgery: Tree Tanglefoot is superior to anything on the market. It will absolutely waterproof crotches of trees, wounds and cavities, when nothing else will.

Endorsed by America's leading horticulturists. Sold by nearly all seed houses and many hardware and drug stores.

PRICES:

1-lb. cans 60c each	5-lb. cans \$2.75 each
10-lb. cans \$5.25 each	25-lb. pails \$11.00 each

Send for free illustrated booklet on leaf-eating insects.

THE O. & W. THUM COMPANY
GRAND RAPIDS, MICHIGAN

TANGLEFOOT

HOUSEHOLD INSECTICIDES

FLY PAPER - FLY SPRAY - FLY RIBBON - ROACH & ANT POWDER - TREE TANGLEFOOT

Do not purchase a Spray Pump until you have received a copy of this catalog.

It's **Free** and will be mailed to any one interested in spraying.

MYERS COG GEAR DOUBLE ACTING SPRAY PUMPS
FIG. 1518
No. R 316 B List \$60.00

MYERS PORTABLE SPRAYERS
FIG. 1614
No. R 336 B List \$30.00

MYERS COG GEAR BARREL SPRAY PUMPS
FIG. 1521
No. R 318 B List \$18.00

MYERS PNEUMATIC COMPRESSED AIR SPRAYER
FIG. 1862
No. 296 List \$7.25

MYERS BRASS BUCKET SPRAY PUMPS
FIG. 1726
No. R 324 List \$7.75

MYERS LOW DOWN AUTOMATIC POWER SPRAY RIG
FIG. 2077
No. 80

Other Important MYERS Products
Pumps for Every Purpose
Hay Tools and Door Hangers

Here's your opportunity to get a copy of our 1924 Spray Pump catalog—a recognized sprayers' guide—absolutely free. A postal card brings it to your door. Shows Myers "Honor-Bilt" Hand and Power Spray Pumps, Spray Guns, Nozzles and Accessories for spraying, whitewashing, cold water painting and disinfecting. Illustrates and describes Myers easy operating, large capacity, Cog Gear Bucket and Barrel Spray Pumps. Pictures and tells all about the new MYERS POWER SPRAY PUMPS and complete POWER SPRAY RIGS with positive self-lubrication, covered working parts, automatic control and other features that will revolutionize power spraying. Also contains complete "How and When to Spray" Guide. If you are interested in spraying, or contemplate purchasing a spray pump, ask for a copy of this catalog today. Leading dealers everywhere sell MYERS SPRAY PUMPS. Yours can supply you. Do not accept a substitute. Insist on the MYERS.

THE F.E. MYERS & BRO. CO. No. 150 Orange St. ASHLAND - OHIO.

and the cut should extend half an inch or more beyond the visible margin of the canker, particularly at the sides since the cankers tend to encircle the limb. The fungus penetrates considerably beyond the visible margin and has been found alive in this tissue in cankers over five years old.

Do Surgical Work in Early Spring.

This surgical work should be done in the early spring before the leaves appear because the cankers are more easily detected at that time and because the wounds heal rapidly and become mere surface scars in the bark. No disinfectant or wound dressing has been found necessary. The main difficulty is in detecting all of the cankers and careful inspections during at least the two following springs are absolutely essential in order to detect and remove cankers that were overlooked or invisible at the time of the first operation.



Blotch cankers on nursery stock.

The Simpson Orchard Co., at Vincennes, have cut the cankers out of more than a thousand young trees in their orchards at a cost of about five to ten cents per tree, and by means of the sprays, have successfully prevented the formation of new cankers so that the disease seems to be almost eradicated from their plantings.

The special blotch sprays, previously alluded to, are absolutely essential in blotch control. It was found by Scott and Rorer early in the study of this disease that it could be successfully controlled by summer sprays of Bordeaux mixture and the principal subsequent changes have consisted in an earlier application of these sprays and the use of weaker strengths of Bordeaux. Results obtained in recent years indicate that the disease is almost perfectly controlled by spray applications at petal-fall and two, four and six weeks thereafter, because the spread of infection seems to be confined to that particular period. There has been, and still is, considerable difference of opinion as to the kind and strength of spray material to use. Results obtained in Indiana indicate that lime sulphur is not as reliable as Bordeaux and that the weaker strengths of the latter, such as 2-4-50, are completely effective against the disease. For the petal-fall spray, the ordinary lime sulphur scab spray may be used, especially on varieties such as Ben Davis, which are subject to Bordeaux injury, because in most seasons the two weeks' spray is early enough to precede the first blotch infection. Because of the Bordeaux russet on Ben Davis, many growers may prefer to use lime sulphur, but the weaker Bor-

(Concluded on page 58.)



GRASSELLI GRADE

A Standard Held High for 85 Years

GRASSELLI has been manufacturing chemicals since 1839. The name, known to every chemical-using industry, is your greatest assurance of quality. In getting results from spraying, so much depends upon the reliability of the spray that it will surely pay you to look for the name Grasselli before you buy!

THE GRASSELLI CHEMICAL CO.
CLEVELAND, OHIO

Branches: Albany, Birmingham, Boston, Chicago, Cincinnati, Cleveland, Detroit, Milwaukee, New Haven, New Orleans, New York, Paterson, Philadelphia, St. Louis, St. Paul.

TALKING-MACHINE FREE

Will talk, sing and play instrumental music from any disc record up to 10 inch. NO EXTRA MONEY TO PAY when you deal with us. We pay the freight.



Strongly and durably made, will give you pleasure for years. We give machine with record free for selling only 50 packets of Garden-Spot Seeds for us at 20 cts. a pack. No money required. We trust you. Write for seeds today. When sold, send \$3 collected and Talking-Machine, complete, is yours. Supply limited. American Seed Co., Lancaster, Pa.

4 LACE CURTAINS FREE

for selling only 40 packets of vegetable or flower seeds (mention which) at 10c large pack. Handsome 5-piece Blue Bird Dinner Set given according to plan in catalog. Send no money. Write for seeds today. American Seed Co., Lancaster, Pa. Box M-1.



We Trust You



GUARANTEED 5 YEARS

All this jewelry is yours for selling only 6 Boxes Mentho Nova halves at 25 cents. Wonderful for candy, soda, burns, etc. Order today. When sold return \$1.50 and all 5 Pieces are yours. U. S. SUPPLY COMPANY, Dept. EF 1, Greenville, Pa.

WRIST WATCH FREE

Guaranteed Ten Years POSTPAID Ladies' wrist watch, small thin model, with ribbon bracelet, fancy clasp. Jeweled movement guaranteed 10 years. Liquid perfume at 15 cents. Nothing more to do. Wonderful thing—everybody loves it. Money, just come and address. BELL PERFUME COMPANY, Dept. C35 CHICAGO



MOORE'S KING OF THE EARLY TOMATO

PRODUCE 25000 PER ACRE PKT 15 cts 2 FOR 25 cts

CATALOGUE FREE GET IT TODAY

THE MOORE SEED CO 125 MARKET ST. PHILADELPHIA, PA.

SMALL FARM
You can rest content. You can doors all California. Ballico, Mo. thirty-six y for irrigati out high l good oppor Joaquin Va for the man a home of per capita from the a soldiers des C. L. Seay Santa Fe R

FLORIDA
ty invite Wonderful tropical sce Fruits and go boating. of Mexico. Splendid bu Living cost longer and P. Young, E

FOR SALE
in the or ated 1/4 m school, % n best market were \$10,000 and sell sep Burnside, Il

WISH TO
purchase a Washington. 10% Bosc everything Modern pre-ding. Addi Magazine.

FOR SALE
acres in Spitsbergen old. 1923 agents. Add sine, Box 19

45 ACRES
Apples, 6 Peaches betv miles from 1 tion. Death N. Chas. Gra

FARM FOR
of Pittsbu orchard. M burgh, Penn.

YOUNG API
acres, \$4,0 ville, Missou

FARM WAN
mediately. souri.

WANTED—T
for sale. C

WANTED—F
er. T. Ho

KENTUCKY
tobacco. M \$3.00; 15 lbs lbs., \$4.50. 2 no logs or t ciation. Box

HOMESPUN
ing, \$1.75; five pounds, Pipe and rec received. K Ky.

THOUSANDS
Strawberry W. F. Allen C land, because True-to-Name a successful gives lots of scriptions and on receipt of

FRUIT TRE
large or sm post. It will buying. Free plums, pears, pecans, vines. Tenn. Nursery

GOOD COMM
Macoupin orchard, practi tica, prime c cated. Some session. Price Brighton, Illi

Classified Advertising

FARMS AND ORCHARDS

SMALL FARMS IN WINTERLESS CALIFORNIA.

You can work a small farm with less capital investment, and in California you can work outdoors all the year. The State Land Board of California is offering choice twenty-acre farms at Ballico, Merced County. Small down payment; thirty-six years time on balance. Ample water for irrigation. A small one-family farm, cutting out high labor costs, insures success. Equally good opportunities in other sections of the San Joaquin Valley, as well as Southern California, for the man of moderate means who wishes to get a home of his own. California is the richest state per capita in U. S. Most of this wealth comes from the soil. No winter handicaps. Illustrated folders descriptive of California mailed on request. C. L. Seagraves, General Colonization Agent, Santa Fe Ry., 911 Railway Exchange, Chicago, Ill.

FLORIDA, TAMPA AND HILLSBOROUGH COUNTY invite you to winter here. Live outdoors. Wonderful orange groves, vegetable gardens, tropical scenery. Strawberries Christmas to June. Fruits and flowers in profusion. Motor, fish, hunt, boating on lakes, rivers, Tampa Bay or Gulf of Mexico. Health restoring, balmy weather. Splendid business and investment opportunities. Living costs reasonable. Come. You will live longer and enjoy life more. Write for literature. P. Young, Board of Trade, Tampa, Florida.

FOR SALE—APPLE ORCHARD OF 103 ACRES in the orchard section of Johnson County, situated 1/2 mile from station, four churches and school, 1/2 mile from concrete road leading to the best markets of the country. Gross sales 1923 were \$10,000. Will divide into 40 and 63 acre lots and sell separately. J. C. B. Heaton & Son, New Burnside, Ill.

WISH TO SECURE WORKING PARTNER TO purchase 400 acres of bearing pear orchard in Washington. Set to 75% Anjou, 15% Bartlett, 10% Bosc. Full equipment, tools, buildings, everything most modern. Production good. Modern pre-cooling plant, suitable for pear handling. Address Box 1-1, American Fruit Grower Magazine.

FOR SALE—BEARING APPLE ORCHARD, 10 acres in Umpqua Valley, near Roseburg, Ore. Spitzenberg and yellow Newton trees, 15 years old. 1923 crop was 4,355 packed boxes. No agents. Address American Fruit Grower Magazine, Box 19-1, Monadnock Block, Chicago.

45 ACRES OF BEARING APPLS, 100 ACRES Apples, 6 years old, with 80 acres of bearing Peaches between Apples, in fine condition. Thirty miles from Baltimore; 2 miles from railway station. Death of proprietor only reason for selling. N. Chas. Graybill, New Windsor, Maryland.

FARM FOR SALE—SEVENTEEN MILES WEST of Pittsburgh, 46 acres, 30 acres in young apple orchard. M. Kell, 1922 Woodville Ave., Pittsburgh, Penn.

YOUNG APPLE AND GRAPE ORCHARD OF 30 acres, \$4,000. Quick. Harry A. Miller, Maryville, Missouri.

FARM WANTED—FROM OWNER; WRITE IMMEDIATELY. Raymond Smith, Maplewood, Missouri.

WANTED—TO HEAR FROM OWNER OF FARM for sale. O. K. Hawley, Baldwin, Wisconsin.

WANTED—FARM IMMEDIATELY FROM OWNER. T. Houck, Tiffin, Ohio.

TOBACCO

KENTUCKY'S BEST NATURAL LEAF SMOKING tobacco. Mild, 10 lbs., \$2.50; medium, 10 lbs., \$3.00; 15 lbs., \$4.50; chewing, 5 lbs., \$2.00; 12 lbs., \$4.50. This is best grade tobacco. We ship no bugs or trash. Valley Farmers Tobacco Association, Box 202, Murray, Ky.

HOMESPUN TOBACCO—FIVE POUNDS CHEWING, \$1.75; ten, \$3.00; twenty, \$5.25. Smoking, five pounds, \$1.25; ten, \$2.00; twenty, \$3.50. Pipe and recipe free. Send no money. Pay when received. Kentucky Tobacco Company, Paducah, Ky.

NURSERY AND SEEDS

THOUSANDS OF THE MOST SUCCESSFUL Strawberry growers buy their plants from The W. F. Allen Co., 14 Market St., Salisbury, Maryland, because they get Healthy, Well Rooted, True-to-Name plants, just what they need to start a successful strawberry bed. Their catalogue gives lots of dependable information besides descriptions and prices. A copy will be sent free on receipt of your name and address requesting it.

FRUIT TREES DIRECT TO PLANTERS in large or small lots by express, freight or parcel post. It will pay you to get our prices before buying. Free, 68-page catalog. Peaches, apples, plums, pears, cherries, grapes, nuts, berries, pecans, vines. Ornamental trees, vines and shrubs. Tenn. Nursery, Box 14, Cleveland, Tenn.

GOOD COMMERCIAL ORCHARD, 80 ACRES, Macoupin County, Illinois, with 70 acres in orchard, practically all bearing. Standard varieties, prime condition. Improved. Splendidly located. Some exchange considered. Quick possession. Price \$30,000. Address: Irving M. Clark, Brighton, Illinois.

FREE GRAPE PLANTS WITH ORDER OF Strawberry and Raspberry everbearing plants. Concord grape plants, \$30.00 per 1,000, all state inspected and guaranteed. Free booklet. Westhauser's Nursery, Sawyer, Michigan.

WE OFFER HEREBY—A NEW PEACH, SU- perior Giant or King of Giants. Perfect Yellow freestone. Over pound weight, etc. Order today. Giant Peach Nursery, 4504 Olive St., Kansas City, Mo.

STRAWBERRIES: STANDARD VARIETIES, \$5.50 per 1000. Raspberries, Dewberries, Grapes, Currants, Gooseberries. Catalog free. Hellenga's Nursery, Three Oaks, Mich.

CUMBERLAND BLACK RASPBERRIES, AROMA strawberry plants, also Dahlia and Gladioli bulbs for sale reasonable. Charles Rickart, Rose-dale, Kansas.

GRAPE CUTTINGS, THIRTY CONCORDS, \$5.00 per thousand. Directions for growing good vines furnished each order. E. V. Wright, Ham-burg, Iowa.

THE WONDERFUL BRODBECK CHERRY, WHY not plant the best. The best is none too good. Write for history. S. S. Brodbeck, Gallatin, Mo.

GLADIOLUS, RAINBOW ASSORTMENT, 50 cents a dozen. Named varieties. ALSO send for list. The Glad Gardens, Sawyer, Mich.

150,000 CUMBERLAND, PLUM FARMER, KAN- sas Black Raspberry plants. Reasonable price. Catalog. Kiger's Nursery, Sawyer, Mich.

10 CHOICE CONCORD AND 2 CALIFORNIA RED Grape Vines. Postpaid, \$1. Collect on delivery. Briercree Nursery, Mt. Carmel, Ill.

4,000,000 NORTHERN GROWN STRAWBERRY Plants, \$2.50, 1000 up. Catalog. Kiger's Nursery, Sawyer, Michigan.

SEND \$2.00 AND GET 12 BRIDAL WREATH Shrubs, 18-inch. Postpaid. Oslund's Nursery, Cambridge, Minn.

FREE—SEND NAME AND GET 25 PEDIGREED strawberry plants free. Piedmont Nursery Co., Piedmont, Mo.

DAHLIAS, PEONIES AND IRIS. Write for cata-logue. James McMullen, Box 447, Council Bluffs, Iowa.

GRAPE, GRAPE PLANTS—Concord, \$1.25 doz. postpaid. A. M. Piazza, Knobview, Mo.

PEACH TREES, 2-3 FT., \$20 PER 100. Pars-ley Bros. Nurseries, Smithville, Tenn.

TEN PACKETS GARDEN SEEDS POSTPAID, 35c. Harry Cure, Atchison, Kansas.

AUTOMOTIVE

AUTOMOBILE OWNERS, GARAGEMEN, ME-chanics, send for free copy of America's popular motor magazine. Contains helpful, money-saving articles on repairing, overhauling, ignition, car-buretors, batteries, etc. Automobile Digest, 613 Butler Bldg., Cincinnati.

TYPEWRITERS

TYPEWRITERS, \$20 UP. FREE TRIAL. EASY payments. Rebuilt Typewriter Co., Rosedale Station, Kansas City, Kans.

PATENTS AND TRADE-MARKS

"PATENT PARTICULARS" AND ADVICE ON trade-marks, free. Write, Sterling Buck, W-629F, Washington, D. C.

HELP WANTED

ALL MEN, WOMEN, BOYS, GIRLS, 17 TO 65, willing to accept Government Positions, \$117-250, traveling or stationary, write Mr. Ozment, 259, St. Louis, Mo., immediately.

MISCELLANEOUS

USE OUR HANDSOME CATALOG; GET ORDERS from every home for Dr. Blair's famous home products. Liberal pay. Dr. Blair Laboratories, Dept. 530, Lynchburg, Va.

FREE BOOK—ELIJAH COMING BEFORE Christ. Megiddo Association, Rochester, N. Y.

HELP WANTED—FEMALE

GIRLS—WOMEN, WANTED. LEARN GOWN making at home. Earn \$25 week up. Learn while earning. Sample lessons free. Write im-mediately. Franklin Institute, Dept. G-548, Rochester, N. Y.

EARN MONEY AT HOME DURING SPARE TIME painting lamp shades, pillow tops for use. No canvassing. Easy and interesting work. Experi-ence unnecessary. Nileart Company, 2266, Fort Wayne, Ind.

AGENTS AND HELP WANTED

EARN \$110 TO \$250 MONTHLY. EXPENSES paid as Railway Traffic Inspector. Position guaranteed after completion of 3 months' home study course or money refunded. Excellent oppor-tunities. Write for Free Booklet G-100. Stand. Business Training Inst., Buffalo, N. Y.

WE WILL PAY YOU AT THE RATE OF \$8.00 per barrel selling quality lubricants to auto and tractor owners, garages and stores. Sell now for immediate and spring delivery. We have been in business 40 years. The Manufacturers Oil and Grease Company, Dept. 11, Cleveland, Ohio.

U. S. GOVERNMENT JOBS, PAY \$100 TO \$250 month. Men—Women, 18 up. Steady. Short hours. Pleasant. Paid vacation. Schedule ex-amination places—free. Write today sure. Frank-lin Institute, Dept. G-104, Rochester, N. Y.

RUG SALESMEN—GET NEXT TO THE BIG-gest seller of the year—Loomrite Felt Rugs. Sell at sight at \$2.50, cost \$15 dozen. Big. com-plete Rug Catalog. Free. Malsley-Payne Mfg. Co., 104K Hanover St., Boston, Mass.

EVERYBODY NEEDS FOOD. OUR PLAN GIVES customer better quality and lower prices. Repre-sentatives wanted. \$100 a week and free automo-bile. Write quick. American Products Co., 1660 American Bldg., Cincinnati, Ohio.

SELLS LIKE BLAZES NEW, INSTANT STAIN remover. Fine premium every sale. Big profits. Outfit free. Write quick. Christy, 23 Union, Newark, New York.

CAN YOU SELL FORD SIZE TIRES AT \$3.50 each? Write for plan. Details free. American Accessories Co., Sales Dept. 3, Cincinnati, Ohio.

WE PAY \$200 MONTHLY SALARY, FURNISH car and expenses to introduce our guaranteed poultry and stock powders. Bigler Company, 5-328, Springfield, Ill.

WE PAY \$50 A WEEK AND EXPENSES AND give a Ford Auto to men to introduce poultry and stock compounds. Imperial Co., D-20, Par-sons, Kan.

EARN \$25 MONTHLY. SPARE TIME. WRITING for newspapers. Exp. unrec., details free. Press Syndicate, 979, St. Louis, Mo.

CHICKS

QUALITY CHICKS—14 PURE BRED VARIE-ties, 100% live delivery guaranteed. Our 8th season. Satisfaction guaranteed. Bank reference. Special prices and illustrated catalog free. Lind-strom Hatchery, Box 267-A, Clinton, Mo.

BABY CHICKS—BEST QUALITY. PRICES LOW. 25 years' heavy laying, 73 acres. Catalogue free. Specializing White Leghorns, Bred Rocks, Reds, Buff Orpingtons. Goshen Poultry Farms, Goshen, Indiana.

DAY OLD CHICKS FOR SALE—STRONG hatched, healthy chicks. Thousands per week at low prices. Circular free. Old Honesty Hatch-ery, Dept. G, New Washington, O.

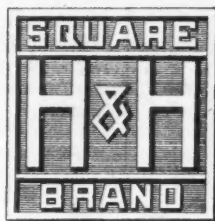
SPECIAL IN 500 TURKEYS, GESE, DUCKS, Guineas, Bantams, Hares, Pigeons, Colles, Fine Poultry Chicks, Eggs, low. Pioneer Farms, Tel-ford, Pa.

CHICKS EGGS, ROCKS, REDS, LEGHORNS, Wyandottes, Langshans, Orpingtons, Brahmas, Egyptian Leghorn Yards, Pinckneyville, Ill.

CHICKS—LEADING VARIETIES. OUR BIG illustrated chick book free. Comfort Hatchery, Box 735, Windsor, Mo.

BABY CHICKS—94c UP. 14 PURE BREDS. Catalog free. Missouri Chickeries, Box 620, Clinton, Mo.

SULPHUR IN ITS MOST EFFICIENT FORM



COLLOIDAL SULPHUR

"A Little Goes a Long Way"

THE MOST SATISFACTORY SUMMER SPRAY

Horticultural authorities instantly recognized that Colloidal Sulphur offered all the qualities they sought in a summer spray. The interest created by the announcement that it is now commercially available was phenomenal.

Colloidal Sulphur is used in its pure state without tree burning adulterants. It requires no mixing, boiling or prepara-tion, and can be used as soon after its arrival as the spray tank can be filled.

Why H & H—SQUARE BRAND—Colloidal Sulphur is the most satisfactory summer spray, and how it accomplishes the results you seek are told in the interesting bulletin, "New Developments in Pest Control," which we will send upon request.

HERBERT & HERBERT, Inc.

PERTH AMBOY, N. J.

Macon, Ga.

730 Forsyth St.

San Francisco, Calif.

Paint Without Oil

Remarkable Discovery That Cuts Down the Cost of Paint Seventy-Five Per Cent.

A Free Trial Package Is Mailed to Everyone Who Writes.

A. L. Rice, a prominent manufacturer of Adams, N. Y., discovered a process of making a new kind of paint without the use of oil. He named it Powder-paint. It comes in the form of a dry powder and all that is re-quired is cold water to make a paint weather proof, fire proof, sanitary and durable for outside or inside painting. It is the cement principle applied to paint. It adheres to any surface, wood, stone or brick, spreads and looks like oil paint and costs about one-fourth as much.

Write to A. L. Rice, Inc., Manufacturers, 12 North St. Adams, N. Y., and a trial pack-age will be mailed to you, also color card and full information showing you how you can save a good many dollars. Write today.

BABY CHICKS From 200- Egg Hens.

Chicks from winter laying, farm raised, mature stock White Wyandottes, White Rocks, Black Minorcas, S. C. W. Leghorns, R. I. Reds, Bred Rocks, White Orpingtons, Anconas, Black Jersey Giants, Indian Runner Ducks, \$15 per 100 up. Pekin Ducks. Live delivery guaranteed. Parcel post prepaid. Hatching eggs, \$8 and up per 100. Circular free.

GLEN ROCK NURSERY & STOCK FARM, Ridgewood, N. J.



THORNWOOD Baby Chicks
All from heavy laying, carefully selected and mated flocks.
15 leading breeds on Free Range. Live Delivery Guaranteed. Our hand-picked, illustrated Baby Chick Book is ready for you. Write for it today.
Thornwood Poultry Yards
Dept. No. Cranford, Indiana

POSTPAID, 100% LIVE DELIVERY. Give us your order for our RELIABLE CHICKS and we will prove to you IF BETTER CHICKS COULD BE HATCHED FOR THE MONEY WE WOULD BE HATCHING THEM. FLOCKS PURE BRED. CULLED BY EXPERTS.

FINE ILLUSTRATED CATALOG FREE. Tells how we produce RELIABLE CHICKS that have pleased thousands of customers. We hatch 13 Varieties. COMBINATION OFFERS. VALUABLE BOOK GIVEN FREE with each order. HUBER'S RELIABLE HATCHERY, Short High St., Fostoria, O.

Newtown Brooders

Coal Burning
Self-regulating; coal capacity for 24 to 36 hours; powerful metal bar regulator; four convenient sizes. Ask for Circular No. 14.

Oil Burning
New, Improved. Lights with match; will not flare up, go out or overflow; broods up to 500 chicks. See Circular No. 44.

Complete New Incubator Catalog Ready
Incubators 75 eggs capacity to 16,000. Write today.
NEWTOWN GIANT INCUBATOR CORP.
69 Warsaw St., Harrisonburg, Virginia

Raised 1025 Chicks NEVER LOST ONE-

Reports Mrs. N. D. Wildt, after following the simple methods outlined by Fred V. S. Gilson, "A Free Book," "Dollars and Sense in the Poultry Business." "You, too, can get bigger hatcheries and raise all your chicks on the Quaker Way, tell how to feed, brood and raise chicks without loss. Hundreds of new secrets that make poultry raising more profitable than ever. No obligations. Send Today. American Poultry School, Dept. 2153 KANSAS CITY, MO.



"JUST-RITE" Baby Chicks EXHIBITION, PEDIGREE and UTILITY Matings, also DUCK-LINGS. FREE FEED with each order. 97% live arrival guaranteed. 1500 hens under trapezoid all the time. Catalog free, stamps appreciated. Nabob Hatch-ery, Ave. 23, Gambier, Ohio. Mem. Int. Baby Chick Assn.

ALL Leading and Rare Varieties

HUBER'S RELIABLE CHICKS OUR 15th. YEAR



WRITE FOR
NEW CATALOG

Experienced Orchardists Know and trust us!

We've been growing and delivering trees from our big nursery in the Yakima Valley for over twenty years. Literally millions of our trees are bearing in the orchards of America.

The confidence of our customers is held by an exact standard of conscientious dealing, based on first-class stock, the best of care and service in handling and shipping, and an absolutely square deal to every customer, no matter what the size of the order.

Let us tell you about our famous

SCOTT RAINIER Apple

"The Dessert Apple Supreme"

Washington Nursery trees are grown in our thousand-acre nursery on the Yakima Indian Reservation—where soil, sunshine, controlled moisture, a long growing season and continuous cultivation enable us to produce nursery trees known from coast to coast for their exceptional quality and unexcelled root systems.

We offer first class Rainier trees, also other standard apples, peaches, pears, plums, prunes, apricots, etc., and a big assortment of small fruits, shade trees, shrubbery, vines and roses.

WASHINGTON NURSERY CO.
Box 8-2 Toppenish, Wash.



Write for free copy of our big new catalog describing hundreds of other fruits and flowers.

2412 **Plant**
WASHINGTON NURSERY Trees
FRUIT AND SHADE TREES
SHRUBS—VINES—ROSES

LOOK FOR THIS TRADE MARK

Apple Blotch Control

(Continued from page 56.)

deaux mixtures have given more satisfactory results in Indiana.

Origin of Twig Cankers.

One of the recent discoveries was that most of the twig cankers originate from infected leaf stems and that the sprays which prevent fruit infection also effectively prevented leaf infection and consequently canker formation. Therefore there is a potent reason for spraying every year regardless of crop to prevent canker formation, since the failure to spray one season will result in a new crop of cankers to spread infection the next year. Of course it is unnecessary to emphasize that this spraying must be careful, thorough and timely. Furthermore, the sprays should be applied every year in young orchards and nurseries in the blotch region, as has been mentioned above, in order to prevent canker formation. These sprays may be accurately timed by observing the blossoming time of bearing trees in the same general region.

Important Supplementary Measures.

In old orchards the problem of blotch control is primarily one of spraying, but there are important supplementary measures. In the first place, it is frequently the case that certain badly cankered trees of such varieties as Northwestern, Smith Cider, Oldenburg, or Mann are serving as sources of annual fruit infection for a number of other varieties. Under such conditions fruit infection has been found on many of the less susceptible varieties, such as Grimes, Winesap and Stayman. Since it is expensive to apply the blotch sprays, and in fact not always desirable to spray Grimes, it may be cheaper in the long run to cut down and remove the blotch carriers, thus eliminating the source of infection. This is especially true in the case of old weakened trees. Furthermore, it is advisable to prune out suckers and water sprouts because these are especially subject to blotch canker. And a certain amount of pruning to open up the trees and thus facilitate thorough spraying is often desirable.

From the foregoing account, it may be seen that in addition to a knowledge of the spray control of fruit infection, orchardists should have a thorough understanding of the canker stage of the disease on nursery stock and in young orchards, and of the manner in which the disease gains a foothold and increases in prevalence in young orchards, so that by canker eradication and annual application of the right sprays they may greatly minimize the future blotch menace.

Timeliness in Apple Scab Control

(Continued from page 51.)

this significant thing: The apple scab fungus is maturing earlier than it was ordinarily supposed. The old spraying rule which has been followed for years and some years, we must grant, successfully, has advised a pink spray. But infection, especially with such early developing varieties as Duchess, has come so early in the last few years as to demonstrate that spraying, which begins at the pink stage and drags on and on, will not do the work consistently. The heavy scab infections of 1922, and which bid fair to be repeated at the next wet spring, result from getting the protection on too late.

For Michigan conditions—and nearby states do not vary greatly in this particular—we are advising strongly either a delayed dormant or a pre-pink spray, not to take the place of, but in addition to the regular pink spray. If these two spray applications are followed by another when the petals fall, the grower will have put on three coatings, in close succession and at the beginning of the season. These are applications when ordinarily the weather is wet—hence dangerous from the point of view of scab—and

when growth of leaves and fruit is most rapid.

Bunching of Sprays Important.

Let me point out that this bunching of the protective sprays in the early part of the season is exceedingly important. The purpose of the very first spring application is to prevent primary infections. The purpose of the second and third applications is to prevent the secondary and tertiary infections. This advice as to method of control is based on soundest biological principles. It recognizes that the scab fungus has enormous power of spreading. If once it becomes established, two or three generations, if unchecked, will spread scab throughout the entire orchard. By preventing as many of the first infections as possible, the secondary infections are few, and by preventing secondary infections largely, the development of the scab late in the season is not serious. And this process of heading off and preventing early infections is the only way that spraying can prevent apple scab. If apple scab is present everywhere on the leaves because you have neglected the primary and secondary infections—or gotten there too late—then such a rain of spores get to the developing apples that all the sprays that can be pumped on in August will not give blemish-free fruit.

During the 1924 season the Michigan station will again give warning to its growers. Other states will handle their local situations. With this information, growers can be sure of getting at their orchards in proper season. In general, each man must design his own spray practice. He knows his varieties, the lay of the land, the period of blooming and leaf development, the influence of sod, and the time it takes to cover the orchard. He must not go contrary to the principles outlined. He must spray when the spores are mature and before they are discharged. He must bunch his attack in the first half of the season. In general, large orchards are under-equipped to cover trees promptly and with despatch. A prepink spray is not a prepink spray if it drags into a pink or a petal spray. If the matter of timeliness means anything, it means the putting on of applications efficiently, thoroughly and promptly.

Spray Materials.

The fruit grower has a choice of spray materials, Bordeaux or lime sulphur, and there may be others. Either of the above mentioned do the work. Criticisms of these mixtures which exist in the minds of some growers and which are based on failures to control scab are rather to be laid to lack of timeliness in application rather than to the fungicides themselves. The evidence of the success of these two materials is so strong as to make their recommendation safe.

The fruit man in controlling scab is engaged in warding off the attack early in the season to secure clean conditions for fruit production. We must watch for the parasite developing on the leaves as a check on the success of his work. He must be on the alert to use to his advantage the timely warnings from his experiment station. But, chiefly, he must spray thoughtfully and purposely to keep clean from the very start the fruit and leaves on which the success of his crop depends.

Extra Copies

of the Spray Number

Those desiring extra copies of the Spray Number can secure them by sending in orders immediately at the following prices:

Single copies	25c each
Ten copies	20c each
Twenty copies	15c each
Twenty-five copies or more	12½c each

If you wish to send copies to your friends and will furnish us the names and addresses, we will mail the copies from this office direct. This will insure delivery in good order and will cost you no more.

AMERICAN FRUIT GROWER
MAGAZINE

53 W. Jackson Blvd., Chicago

Kind words from a smoker in far Australia

There is something besides distance that lends enchantment to this letter

A more modest manufacturer might not print this letter. He might file it away to bring out only on dull, gloomy days.

Nevertheless, when an enthusiastic pipe-smoker thousands of miles away takes his pen in hand to say something nice about Edgeworth, a breach of modesty on the manufacturer's part should be forgiven.

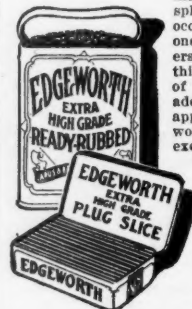
"Chetwynd," Copeland Road,
Beecroft, New South Wales,
Australia.

Larus & Brother Co.,
Richmond, Virginia, U. S. A.

Gentlemen:

Perhaps you are somewhat surprised to receive this letter from Australia, often referred to in England, our Mother Country, as "Down Under."

I have noticed in some of your American magazines that I subscribe to, testimony in praise of your splendid tobacco. It has occurred to me that, as one of the many smokers of the Edgeworth in this Southern Continent of Australia, I can also add my testimony and appreciation of your world-wide-known and excellent tobacco.



It must be over twenty years since I first tried your "Edgeworth Extra High Grade Plug Slice."

My tobaccoist, one of the leading tobaccoists of Sydney, had a trial consignment of the Edgeworth to test the taste of his customers.

Just at that time I was smoking several kinds of high-grade imported tobaccos, but somehow I could not get any of them that exactly pleased my taste. Some brands were excellent for a while, and then deteriorated.

But from the first purchase of your Edgeworth I have found it absolutely of the one uniform standard, without any change during the whole twenty-odd years I have been smoking it. I have been so satisfied with it that I have never purchased any other make.

I have induced a great number of my friends and fellow officers to try Edgeworth, and most of them have the same high opinion of it that I have.

My wish is that your company may prosper and continue to manufacture the renowned Edgeworth, and that I and my fellow smokers of this "Fair Australia" may be spared to a good, ripe old age to enjoy your fragrant weed.

Yours sincerely,
(Signed) Thos. Skellett.

And all of this as a result of the one "trial consignment" of Edgeworth.

While it is too much to hope that everyone will have a satisfied smoking career after a few trial pipes of Edgeworth, you can never tell until you try the tobacco.

For free samples of Edgeworth—generous helpings of both Edgeworth Plug Slice and Ready-Rubbed—send a postcard with your name and address to Larus & Brother Company, 83 South 21st Street, Richmond, Va.

If you will also include the name and address of your regular "tobacconist," your courtesy will be appreciated.

To Retail Tobacco Merchants: If your jobber cannot supply you with Edgeworth, Larus & Brother Company will gladly send you prepaid by parcel post a one- or two-dozen carton of any size of Edgeworth Plug Slice or Ready-Rubbed for the same price you would pay the jobber.